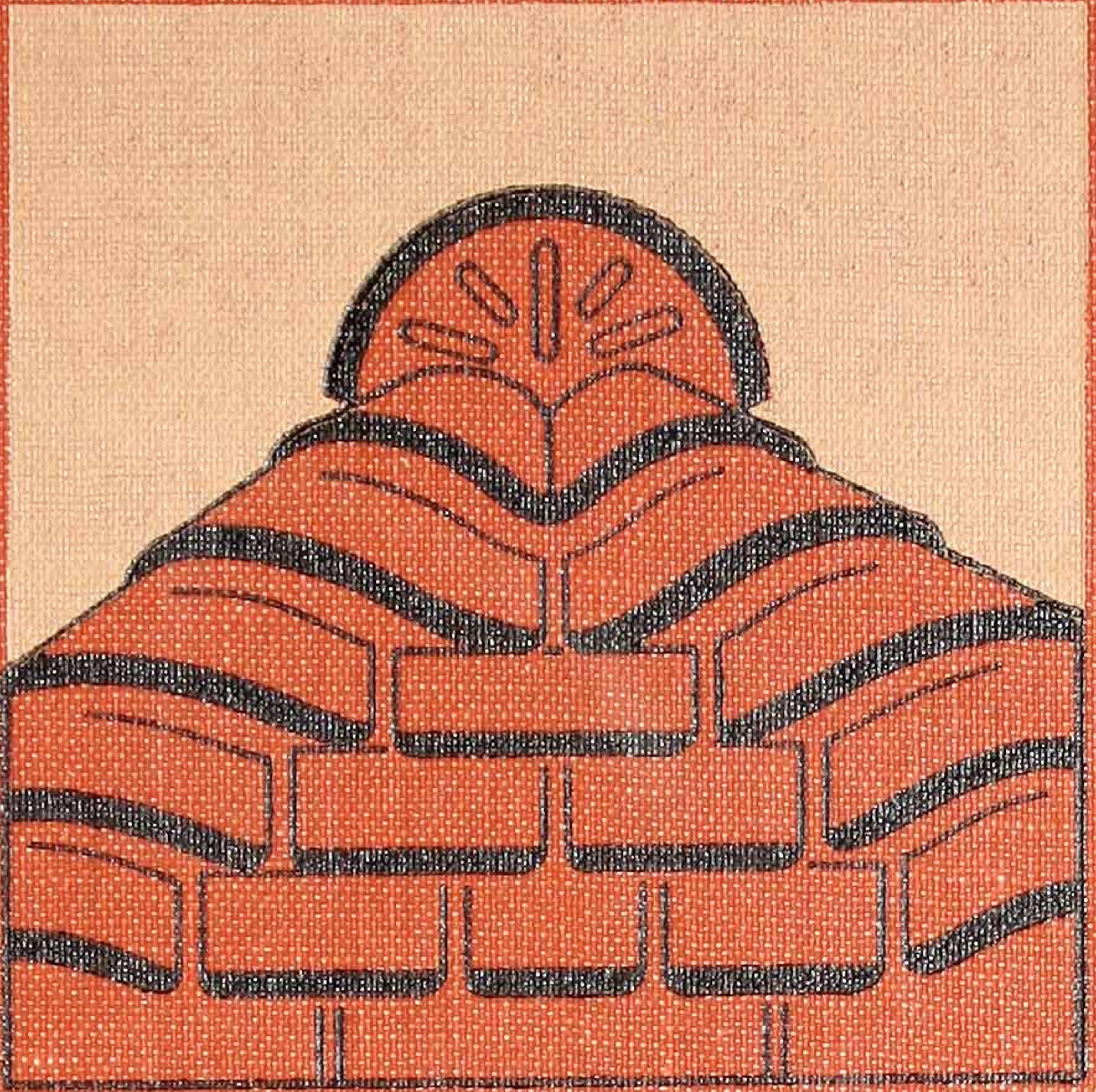

'ACME'

ROOFING TILES

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G.H.D.

THE LATE Mr. G. H. DOWNING

Founder of the business of

G. H. DOWNING & CO., LTD.

G. H. DOWNING & CO. LTD.

CHESTERTON

STAFFS.

Telephone: STOKE-ON-TRENT **68003**

Head Offices: Chesterton, Staffs.

Roofed with our Multi-coloured Sandstorm tiles.

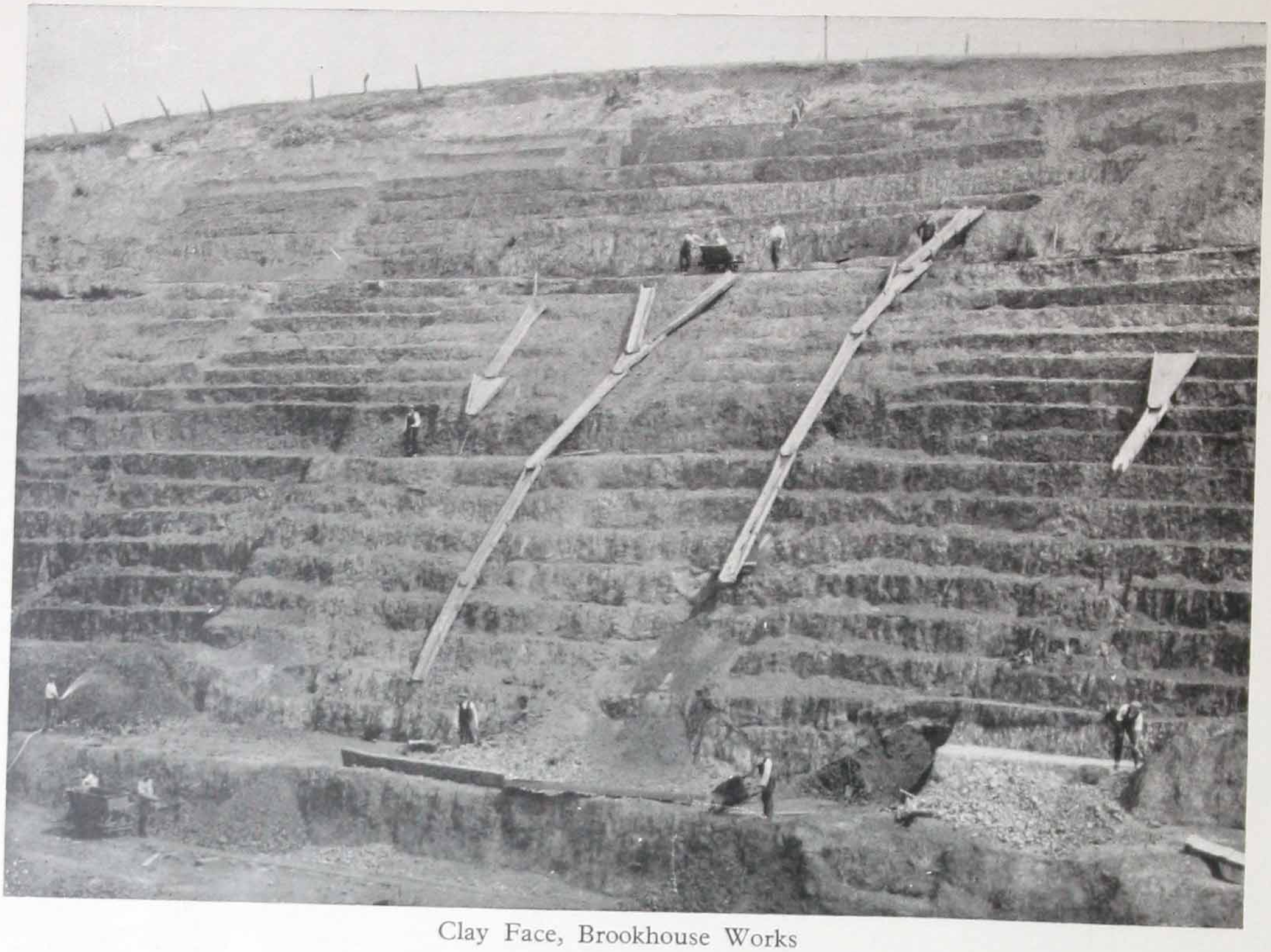
See our displays at
The Building Centre Ltd., 158 New Bond St., London, W.1 and
The Scottish Building Centre Ltd., 425 Sauchiehall St., Glasgow

Works:

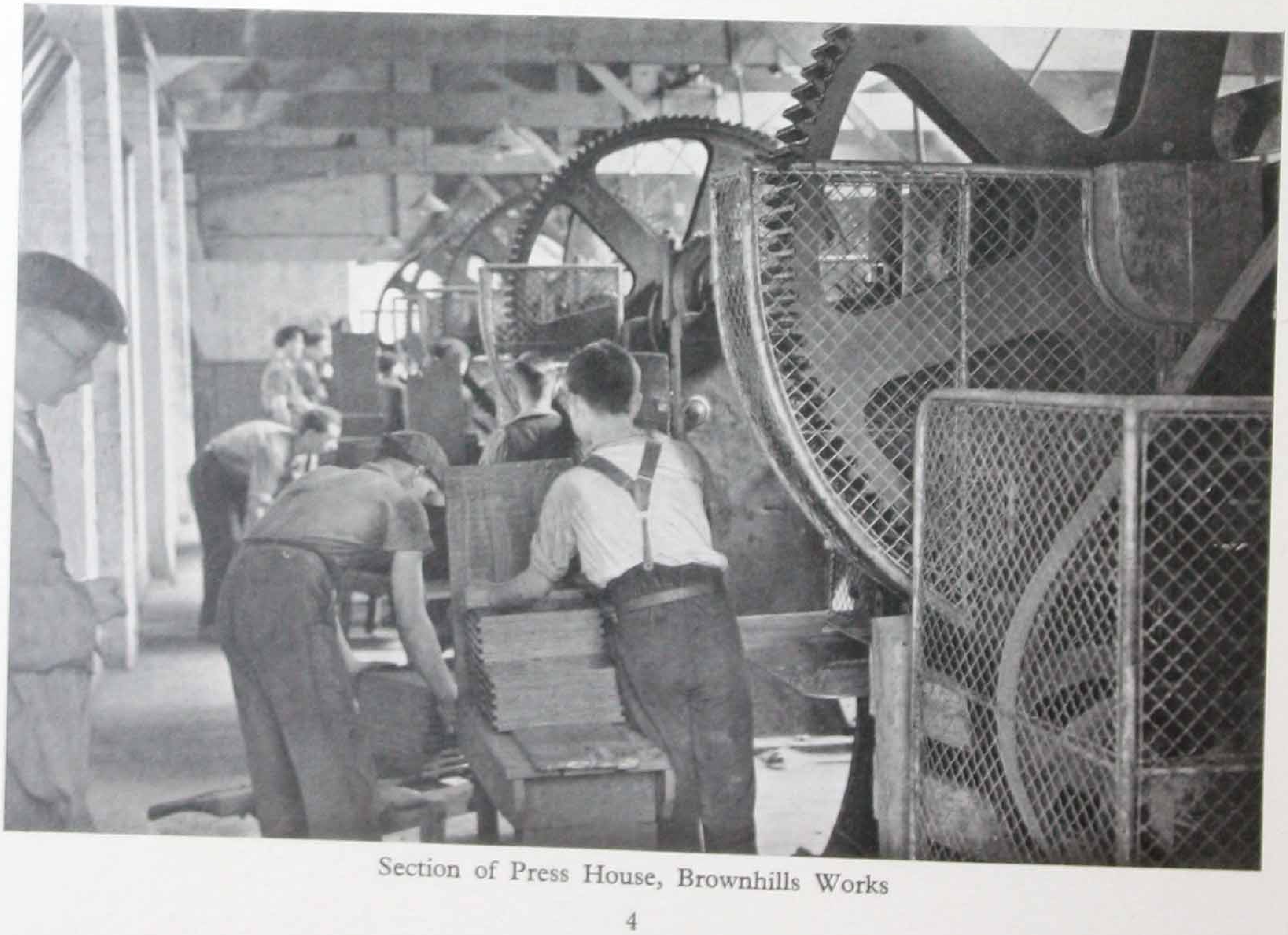
AUDLEY ROAD, CHESTERTON
BROOKHOUSE
BASFORD
BLURTON
BROWNHILLS
KNUTTON
KEELE
ETRURIA
APEDALE
CHARFIELD, Glos.
LIGHTMOOR, Shropshire

THE CLAY ROOFING TILE

A subject in such constant use, working twenty-four hours a day, one hundred and sixty-eight hours a week, is worth more than a passing thought and deserves consideration, not only in its choice but in its manufacture, present and past. The present efficiency of the fired Clay Roofing Tile may be compared in its progress with the development of the Downing Group of Tileries, for experience has been the foundation by which the success of each has been achieved. The origin of the tile is easy to imagine. Since earliest times, when our forefathers sought protection in the trees of the forests, their earliest constructive attempts used earth and clay for protection : experience soon proved the success of sun-dried clay in resisting the elements, and the natural outcome has been the fired clay roofing tile. It is known that tile making was pursued in Great Britain in Roman times—a present style of tile, the double Roman, reproduces that of early Italian architecture—but it was not until the Thirteenth Century that clay tiles began to supersede the thatched roof which was then in general use. To-day the use of the clay tile in general building speaks for itself ; fired to high temperatures, weather proof, decorative and permanent both in composition and in colour, it forms an integral part of all building schemes and by proved merit easily resists the challenge of the cheap and temporary substitutes which are offered from time to time.



Clay Face, Brookhouse Works

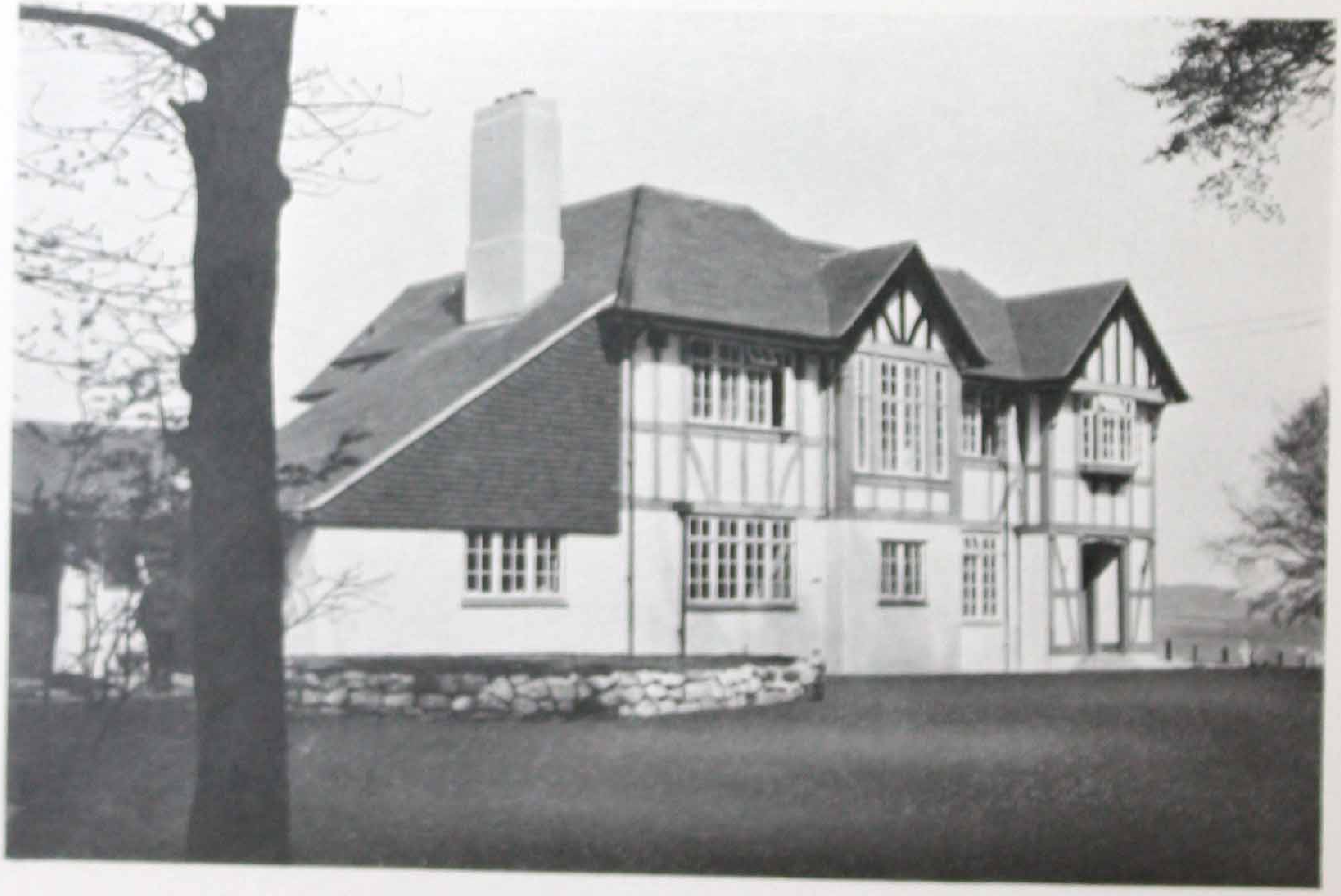


Section of Press House, Brownhills Works

PROCESS OF MANUFACTURE

The process of manufacture is not a complicated one. The Clays are obtained from natural clay beds which are systematically worked, and are exposed to the natural elements so that the all-important " Weathering " process can be carried out. " Mixing " of the various constituents in the proportions required for the finished article is a process in itself, and it is found that the weathering process is best applied to the complete mixture rather than to the separate individual ingredients, so that " Mixing " and " Weathering " are allied processes. This weathering process is necessary in order to break down the clays into more elemental form by the combined erosive action of the elements, frost, sun, moisture, etc. Considerable time is necessary for this to achieve maturity, and incidentally it is interesting to note that in 1477 laws were enacted specifying a minimum period for clay weathering in tile manufacture. The reason for this does not appear hard to seek ! "Weathering" is followed by " Pulverising " and " Grinding." First, water is mixed with the finely-divided clay and ground until the right consistency is reached. It should be noted, that in both Hand-Made and Machine-Made Tile manufacture, the clay is used in the plastic state, but it is from here that the paths of Hand-Made and Machine-Made Tiles diverge. For the Hand-Made Tile, soft plastic " Pugged " clay, which has been allowed to " sour " in damp storage houses for several days is used, and the method of manufacture is the old-fashioned one as used for centuries, each tile being moulded individually

ANCIENT
and
MODERN

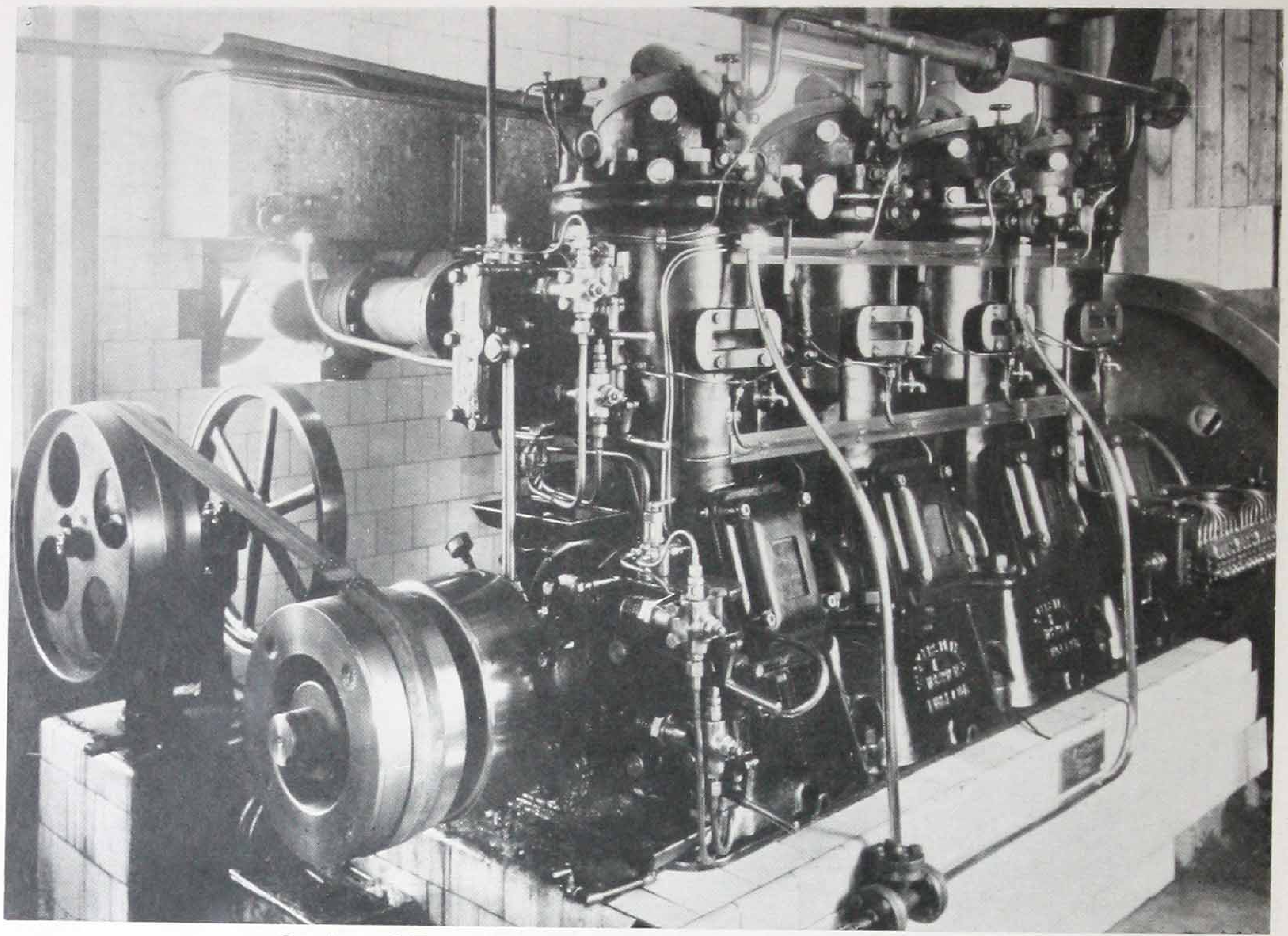


Example of Roofing with Tudor Hand-Made Tiles and shaped by hand only. Sand is spread evenly all over a Mould in shape that of the tile, and the tile moulded from the plastic clay. It is now in so soft a condition that " pallets " are required to place the tile on a warm floor in order to stiffen.

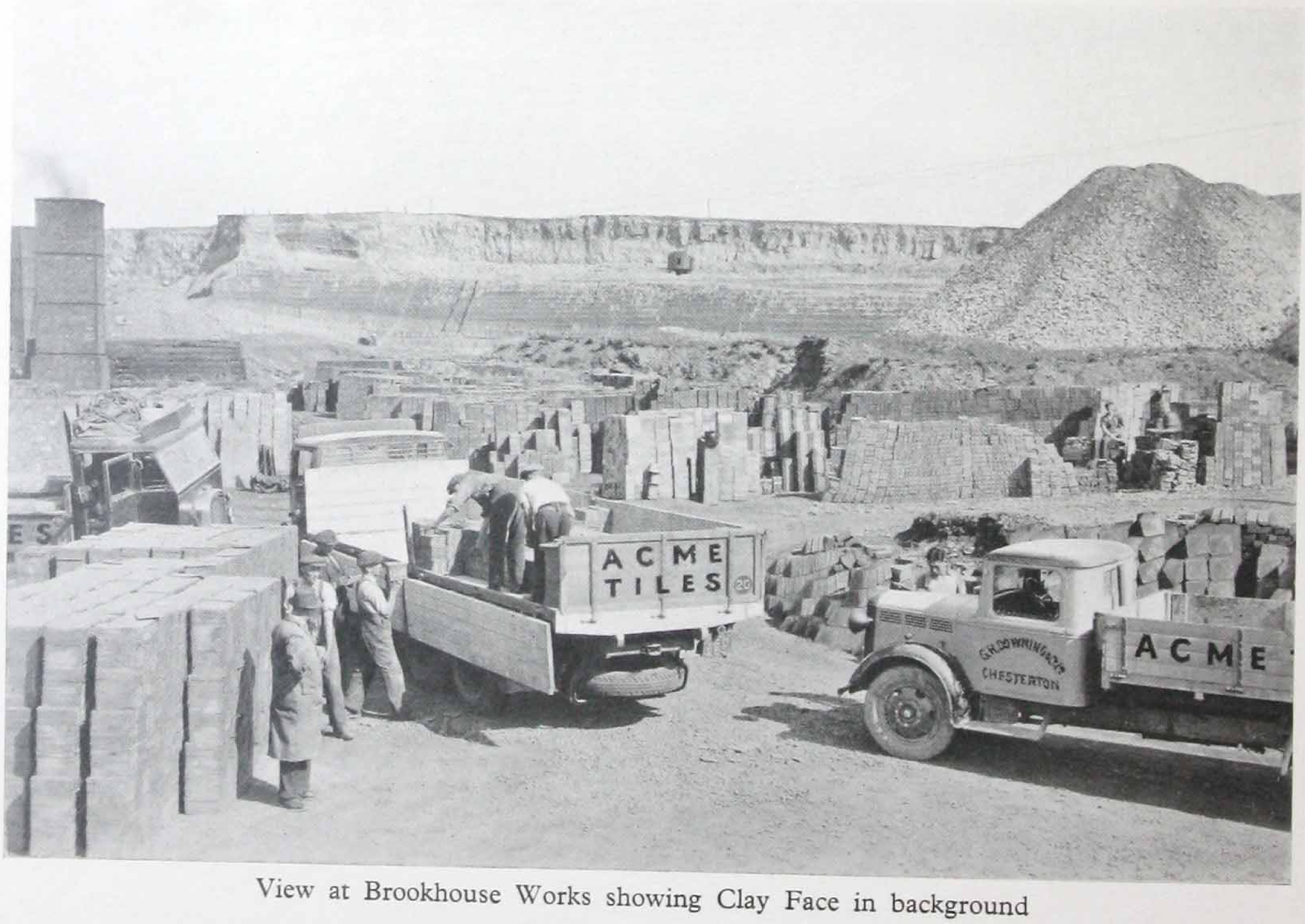
The purpose of the sand here is two-fold : first, to enable the clay the more easily to leave the mould, and, second, to give the " sand-faced " finish to the tile. After a drying period the tiles are dressed and stacked up in order to cool and toughen. Subsequently they are cambered and further dried. After a period of from ten to fourteen days they are then ready for the kiln.

In the Machine-Made process the prepared clay is rolled out in the form of a ribbon slightly wider than the finished tile to allow for shrinkage and is then automatically cut off longitudinally into the required lengths, called "Bats." These are stored in "Bat Houses" for "Souring" or maturing, and after sufficient time has elapsed they are pressed and stacked in the Drying Sheds. In both processes the "Drying" is effected by storing the "green" tiles in sheds in order to permit of the removal of moisture by evaporation. After which the " firing " is effected. This takes place in closed kilns, and is now not as dependent on the skilled experience of the fireman as was formerly the case. The progress of science applied to industrial methods has enabled the temperature of the kilns to be controlled with an accuracy previously impossible, and much more consistent results are now obtained.

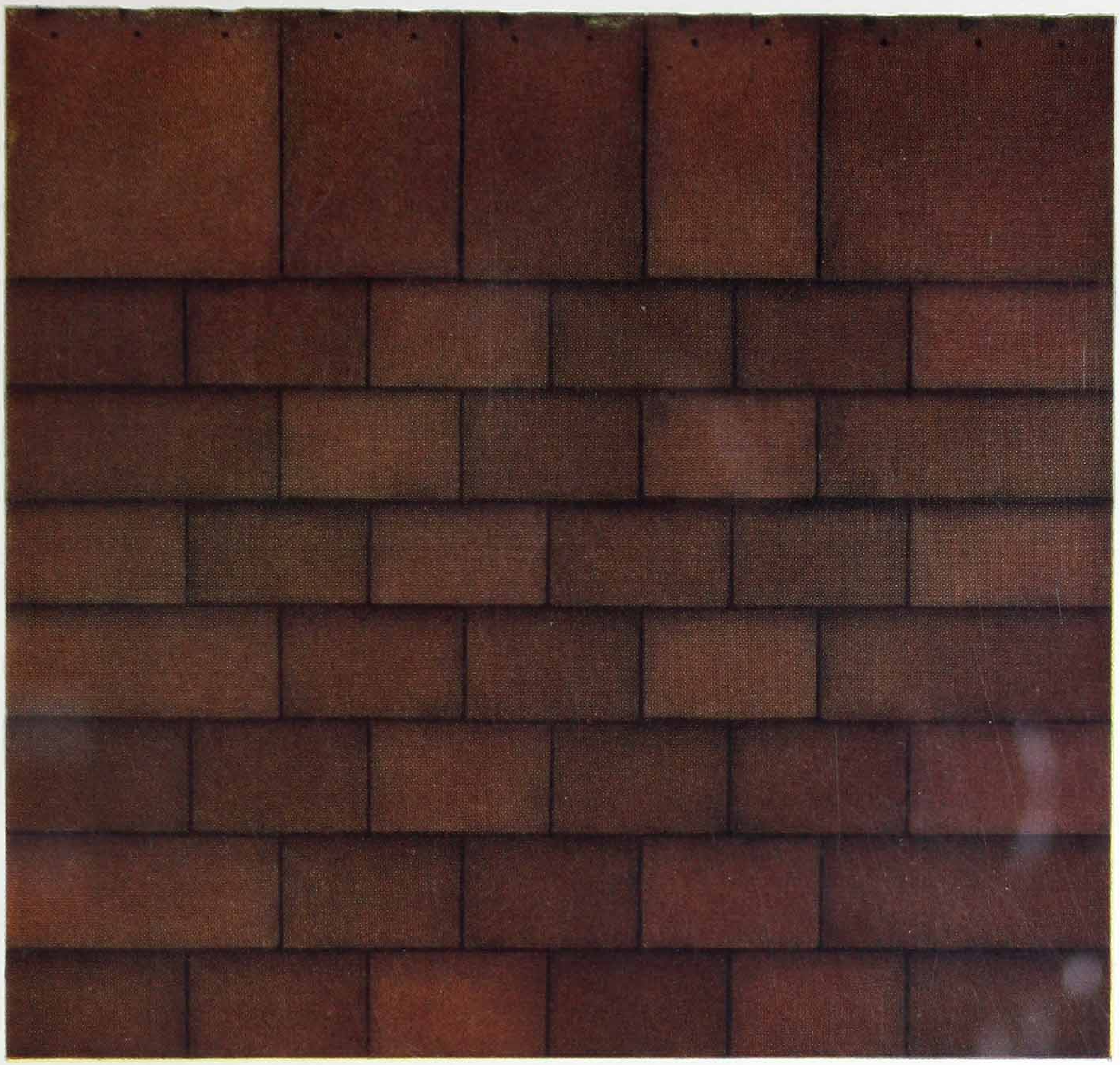
The finished tile now having been arrived at, it remains only for the sorting into the different classes by skilled operatives for the tiles to be ready for the use for which they are intended.



Section of Power House, Audley Road Works, Chesterton



View at Brookhouse Works showing Clay Face in background

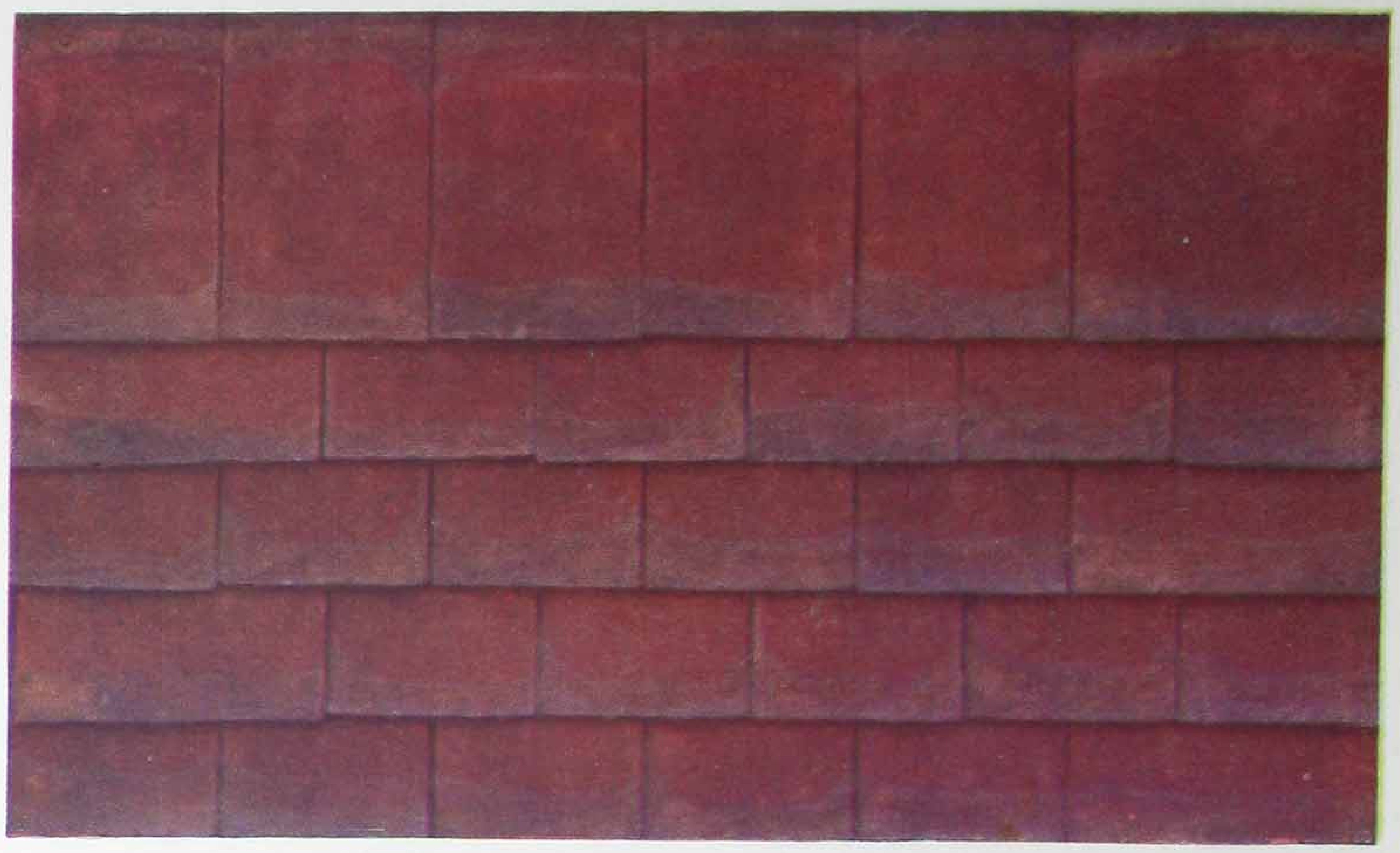


Russet Brown Acme Sandstorm

This process of manufacture, believed to be the most thorough and up-to-date, has been evolved during the development of this company. The founder, the late Mr. G. H. Downing, originally began the manufacture of roofing

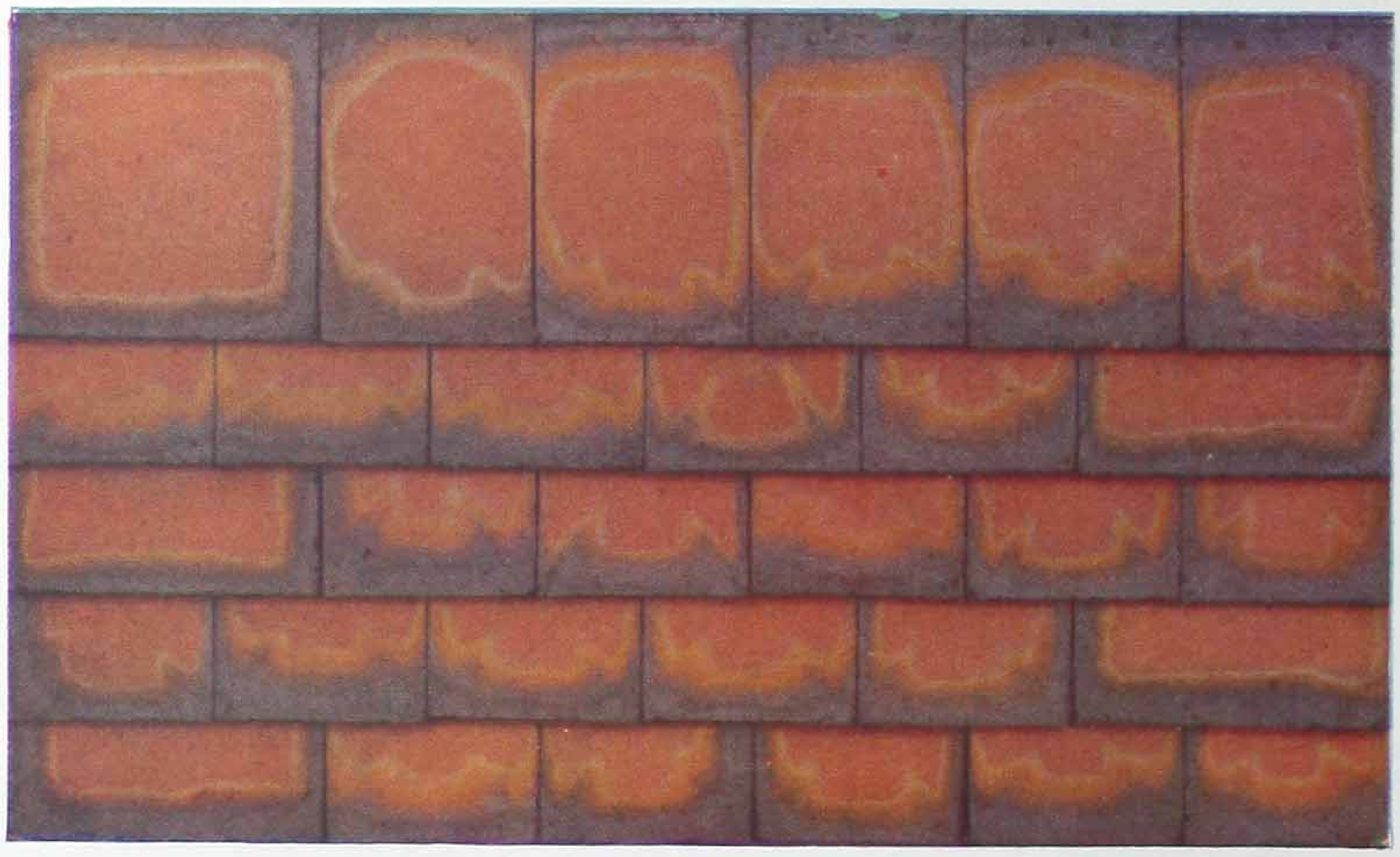
“ACME/CENTURY”
Machine-made
Sandfaced Tiles

DARK PURPLE
SANDFACED

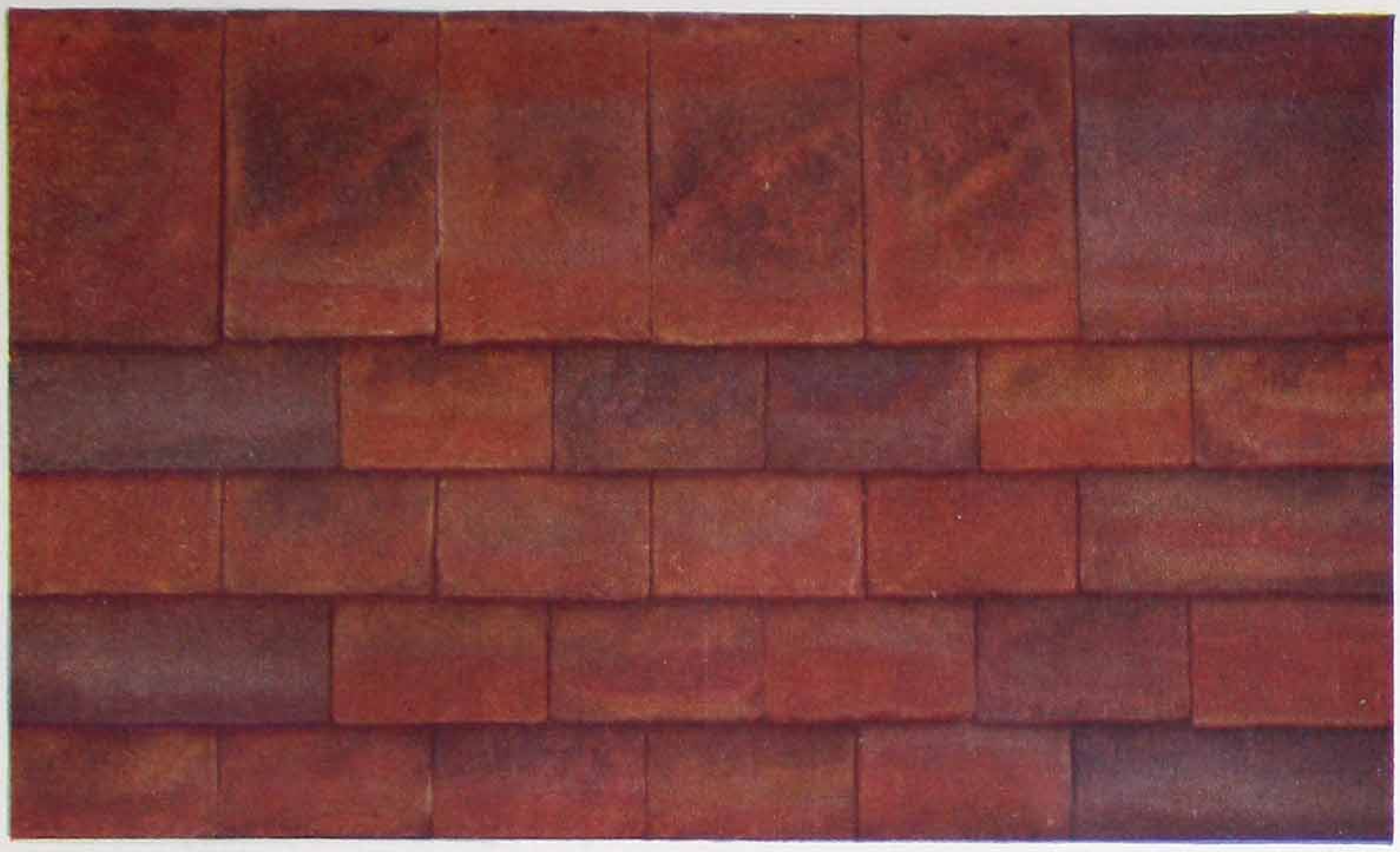


“ACME”
Roofing Tiles

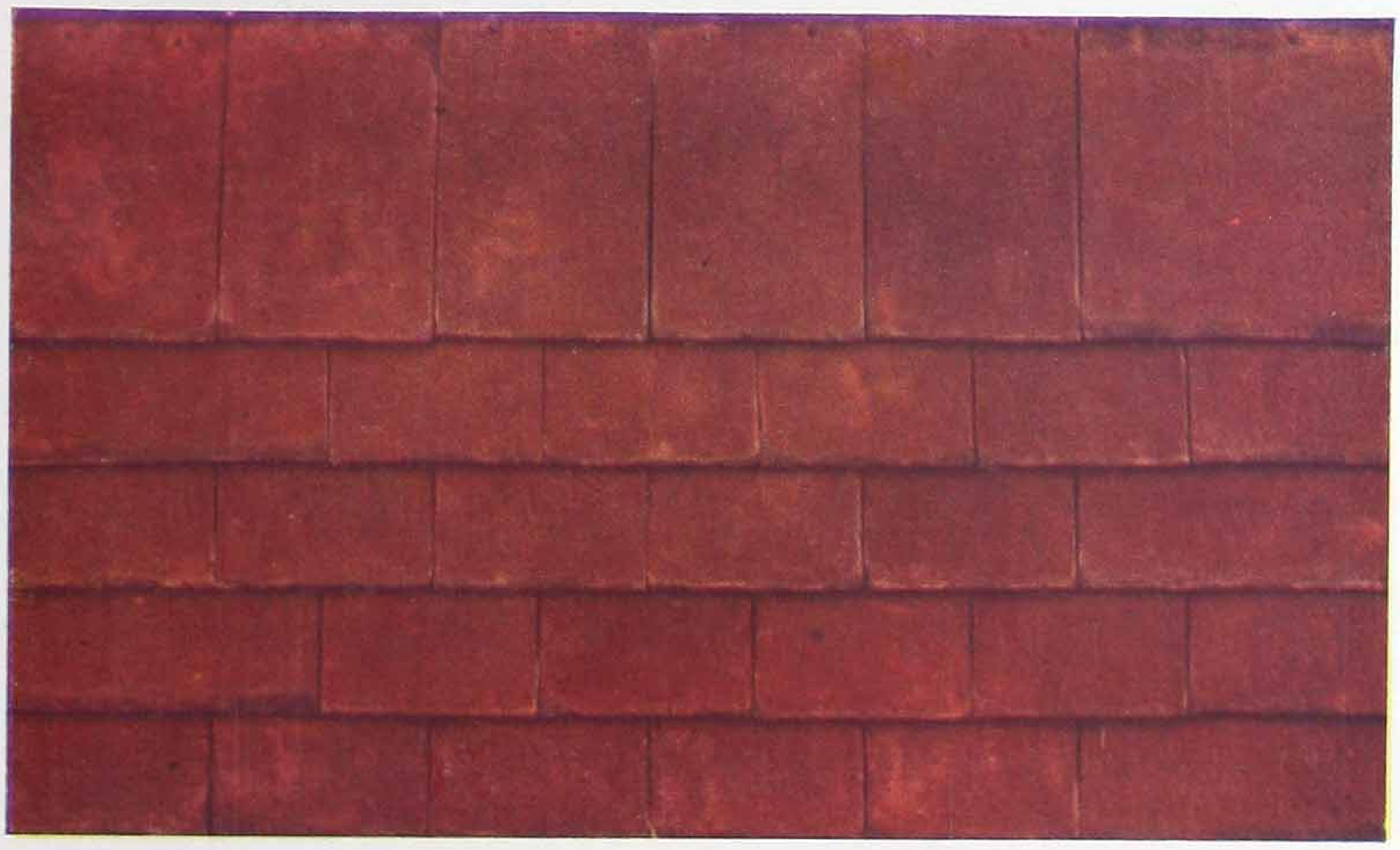
MACHINE-MADE
RED PRESSED. No. 3.



tiles at Brookhouse Tileries, Chesterton, where he commenced a lifetime study of the clay tile and the finer points in its manufacture. The first essential of the tile is to be permanently weather-proof: it must not laminate or shale



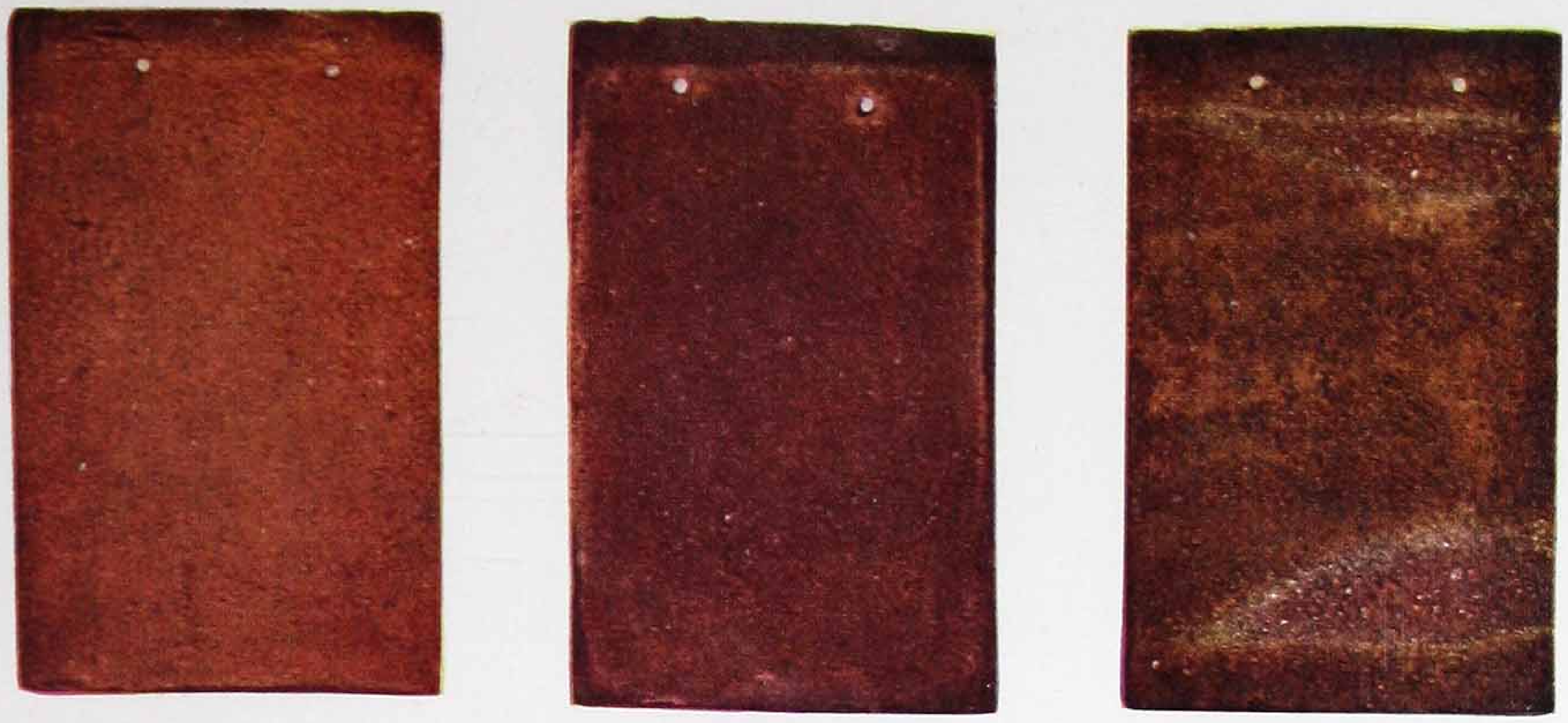
"ACME/CENTURY"
Hand-made Tiles
RUSTIC
SANDFACED



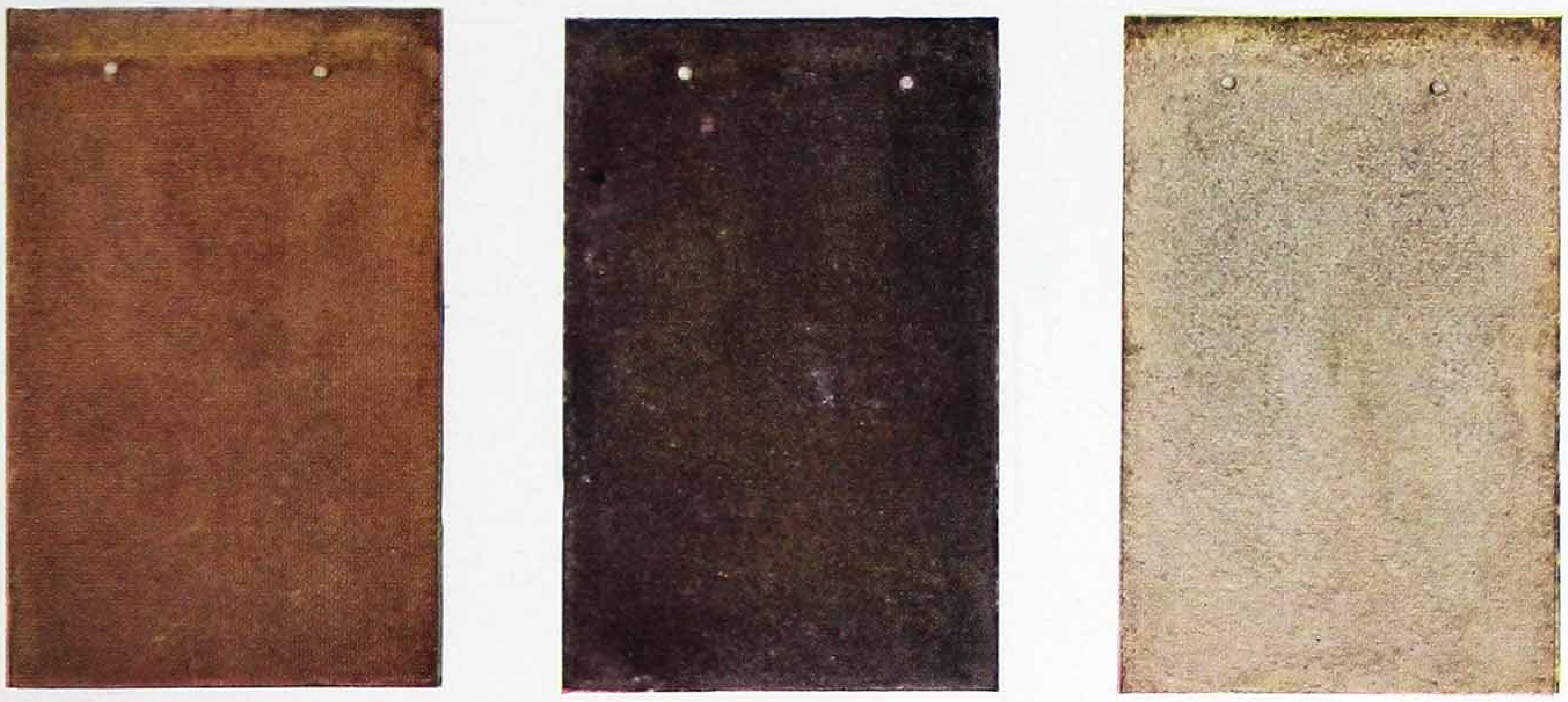
"ACME/CENTURY"
Hand-made Tiles
RED
SANDFACED

and must be able to withstand the severest weather conditions. One advantage that clay tiles have over substitutes is that the colours are permanent and improve with age.

A combination of these qualities gives the most natural tile, being Hand-Made and not far removed in colour from the natural clay. Instance our ACME CENTURY RED, AND RUSTIC HAND-MADE tile. It is, of course, well-known that the Staffordshire clay beds are the best in the world for tile manufacture. The particular combination of elements forming the clay, found here in abundance, has proved by experience when correctly fired to produce the finest finished product, and the North Staffordshire seams are well-known for this purpose. But though, however, the Hand-Made article is, as in many other products even in these specialised days still the best, the inevitable force of competition demanding something less costly, the Machine-Made tile appeared by modern methods of mass production. Here the late Mr. Downing found it necessary to expand his plant and gradually the existing works were acquired. By this time the roofing tile had long ceased to be regarded only as a weather-proof covering, and took shape as an ornament, conspicuously decorative, and varying colours and shades were in demand, not only to decorate in themselves but to harmonize with other objects, schemes and countryside backgrounds. This firm was one of the first to specialise in this direction with the result that the present wonderful range of colours now available is such that any scheme or background can be matched and beautified.



RED PURPLE RUSTIC



RUSSET BROWN TUDOR SILVER GREY

COTSWOLD GREY DARK RUSTIC No. 2 DUN BROWN

Range of Colours in "ACME/CENTURY" HAND-MADE

AUTUMN TINTS

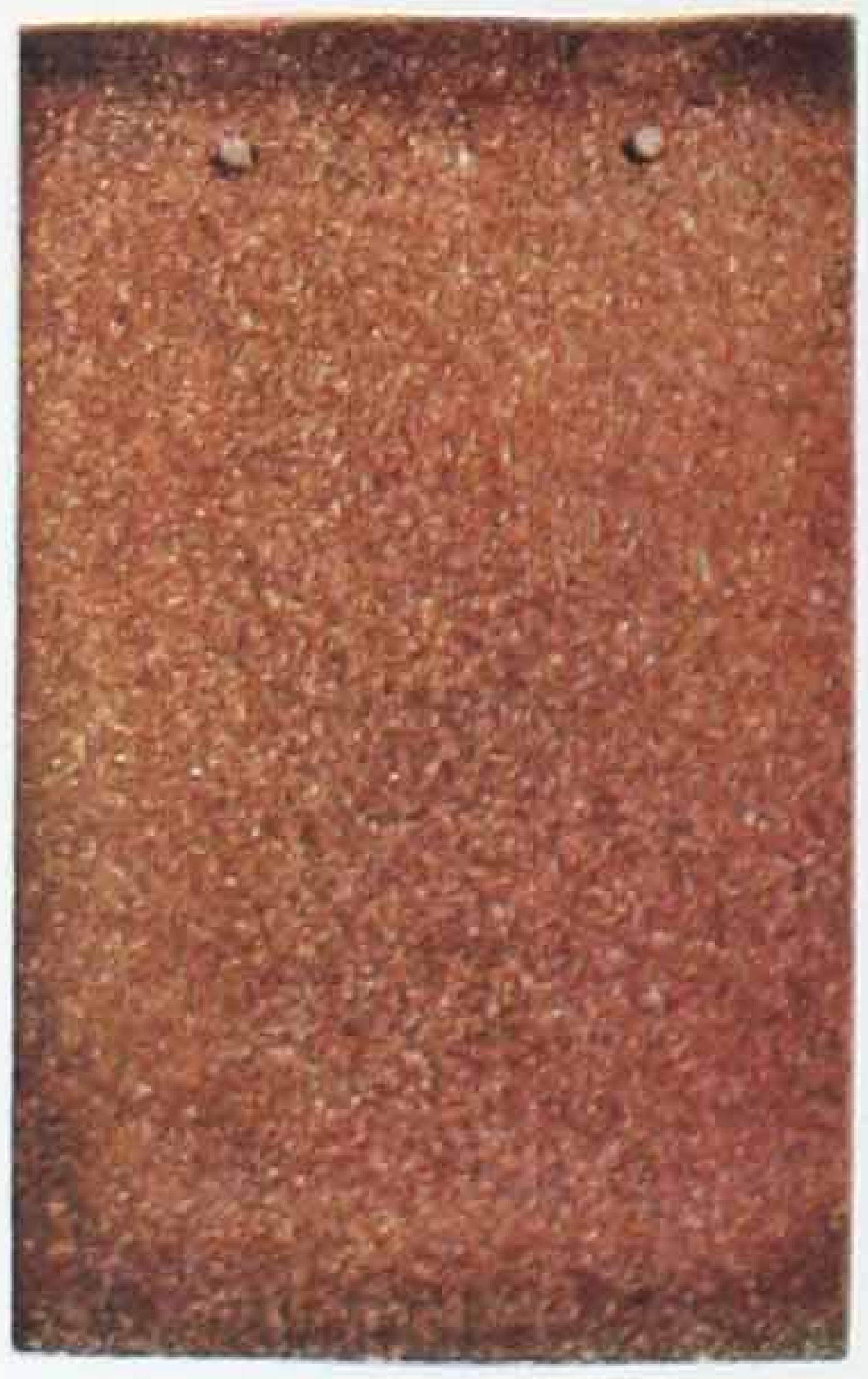
MEDIUM PURPLE

RED A A

HEATHER MIXTURE

LIGHT GREY

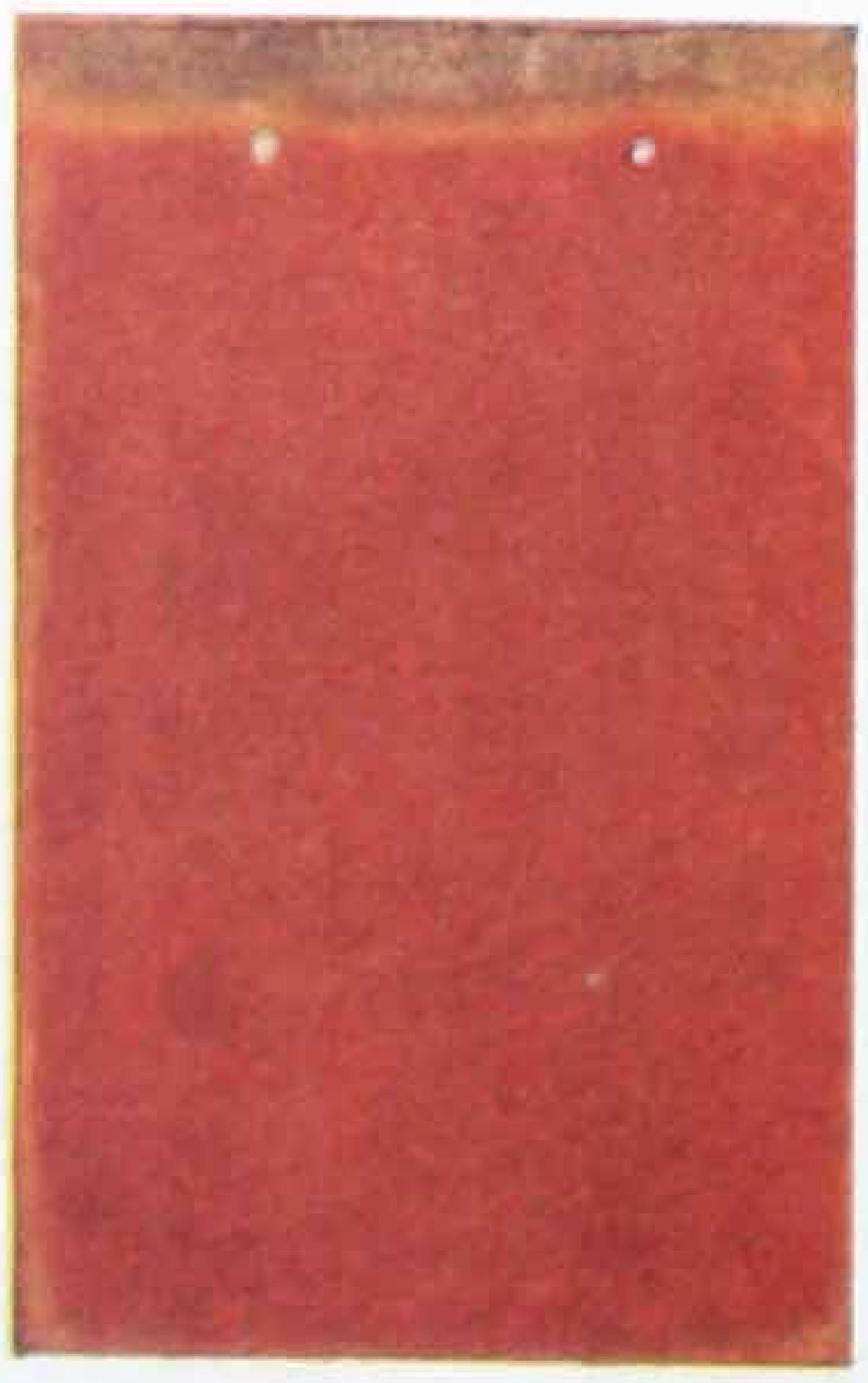
DARK GREY



CRYSTAL PINK

BLUE BLACK

SILVER BLACK

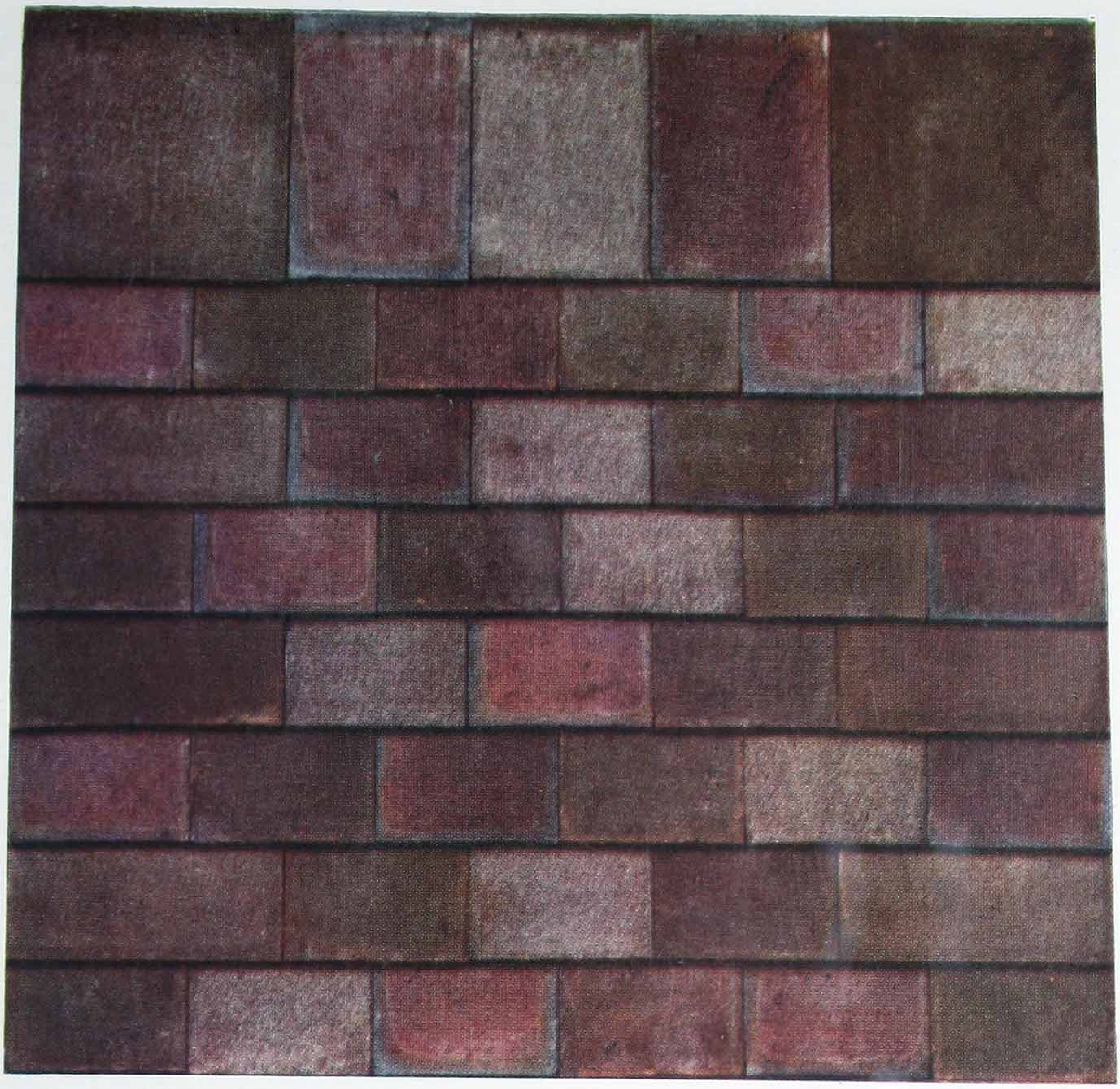


LIGHT RED "F"

WESTMORELAND GREEN

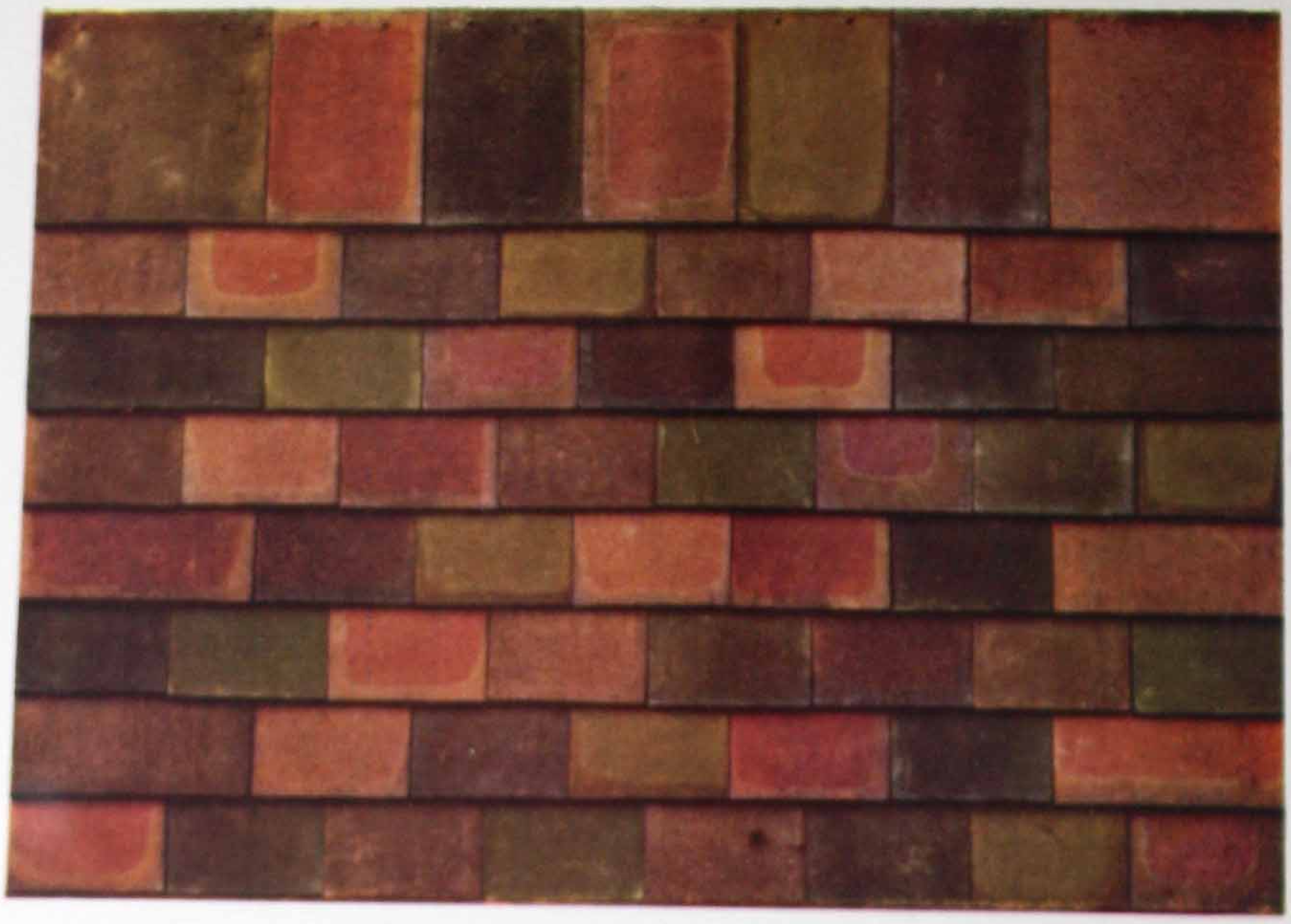
RUSSET BROWN

Range of Colours in "ACME/SANDSTORM"
(Patent No. 370613)



Acme Sandstorm Heather Mixture Variety

Hereabouts it would be opportune to mention a new sanding process adopted by the company, which revolutionised the whole idea of sand-faced tile production. In this method of applying the sand to the tile by Patented Process (No. 7970/31), which has only been arrived at after years



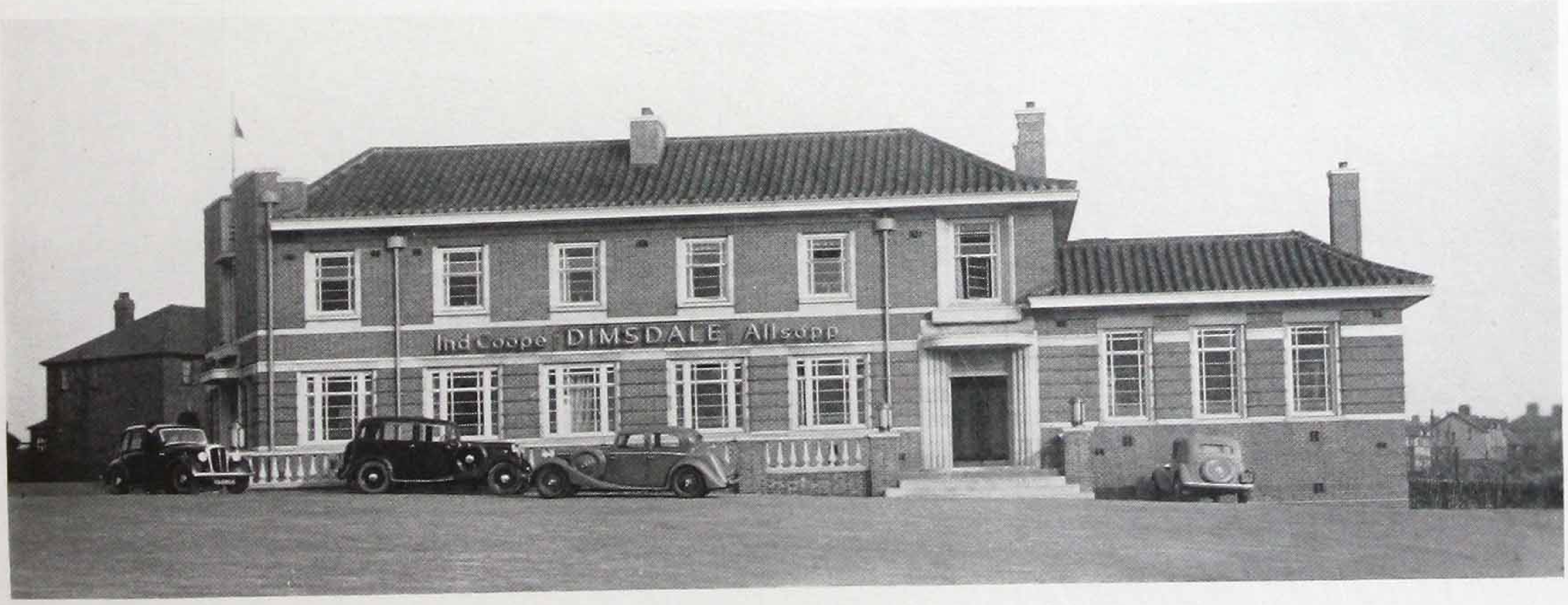
Multi-Colour Hand-made

of exhaustive scientific research, the sand is forced through fine apertures into the face of the tile at a velocity of 1,740 miles per hour before firing, and the combination of the impregnated clay with the driven sand, fused under high temperatures, produces a result which cannot be equalled for permanent retention of the sand and closeness of face. Both the rough and the smooth surfaces can be produced by this process. This Sandstorm tile can now be supplied in an unprecedented range of shades and effects, and reproductions of a few specimens are appended. These colours are permanent, being produced in the operation of firing, and can be supplied to match any and every building scheme.

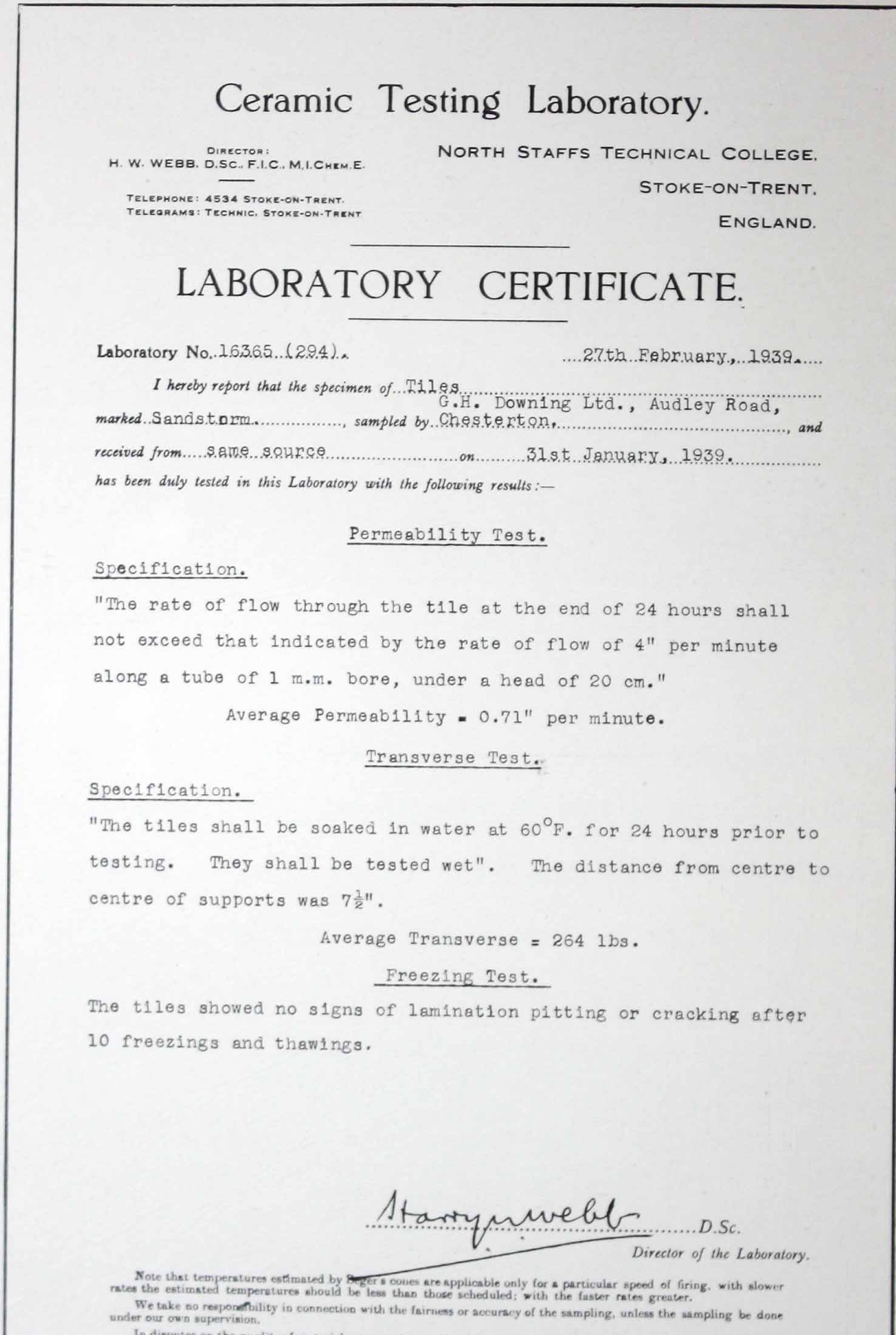
Acme roofing tiles are frequently subjected to severe laboratory tests in order to ensure that their high quality and texture is being fully maintained.

On pages 18 and 45 are reproductions of laboratory certificates recently obtained.

By this time the Company had achieved its present unique position in the tile trade. A group of ten works situated for the most part on the North Staffordshire Clay Beds but reaching to various parts of the country, with Hand-Made or Machine-Made manufacture allotted thereto, and the opportunity of using the South Shropshire and the Gloucester clays : the works in the south giving easy access to distant sites with a minimum of carriage charges : and a combined output of five million tiles per week, large supplies being available at the shortest notice. The following illustrations are of typical subjects representing all classes of buildings which have been roofed in different styles.



Dimsdale Hotel, Chesterton. Roofed with Acme Italian Rolls.



Ceramic Testing Laboratory.

DIRECTOR:
H. W. WEBB, D.Sc., F.I.C., M.I.Chem.E.

TELEPHONE: 4534 STOKE-ON-TRENT.
TELEGRAMS: TECHNIC, STOKE-ON-TRENT

NORTH STAFFS TECHNICAL COLLEGE,
STOKE-ON-TRENT,
ENGLAND.

LABORATORY CERTIFICATE.

Laboratory No. 16365 (294). 27th February, 1939.

I hereby report that the specimen of Tiles

marked Sandstorm, *sampled by* G.H. Downing Ltd., Audley Road, Chesterton, *and*

received from same source *on* 31st January, 1939.

has been duly tested in this Laboratory with the following results:—

Permeability Test.

Specification.

"The rate of flow through the tile at the end of 24 hours shall not exceed that indicated by the rate of flow of 4" per minute along a tube of 1 m.m. bore, under a head of 20 cm."

Average Permeability = 0.71" per minute.

Transverse Test.

Specification.

"The tiles shall be soaked in water at 60°F. for 24 hours prior to testing. They shall be tested wet". The distance from centre to centre of supports was $7\frac{1}{2}$".

Average Transverse = 264 lbs.

Freezing Test.

The tiles showed no signs of lamination pitting or cracking after 10 freezings and thawings.

Harry W. Webb D.Sc.
Director of the Laboratory.

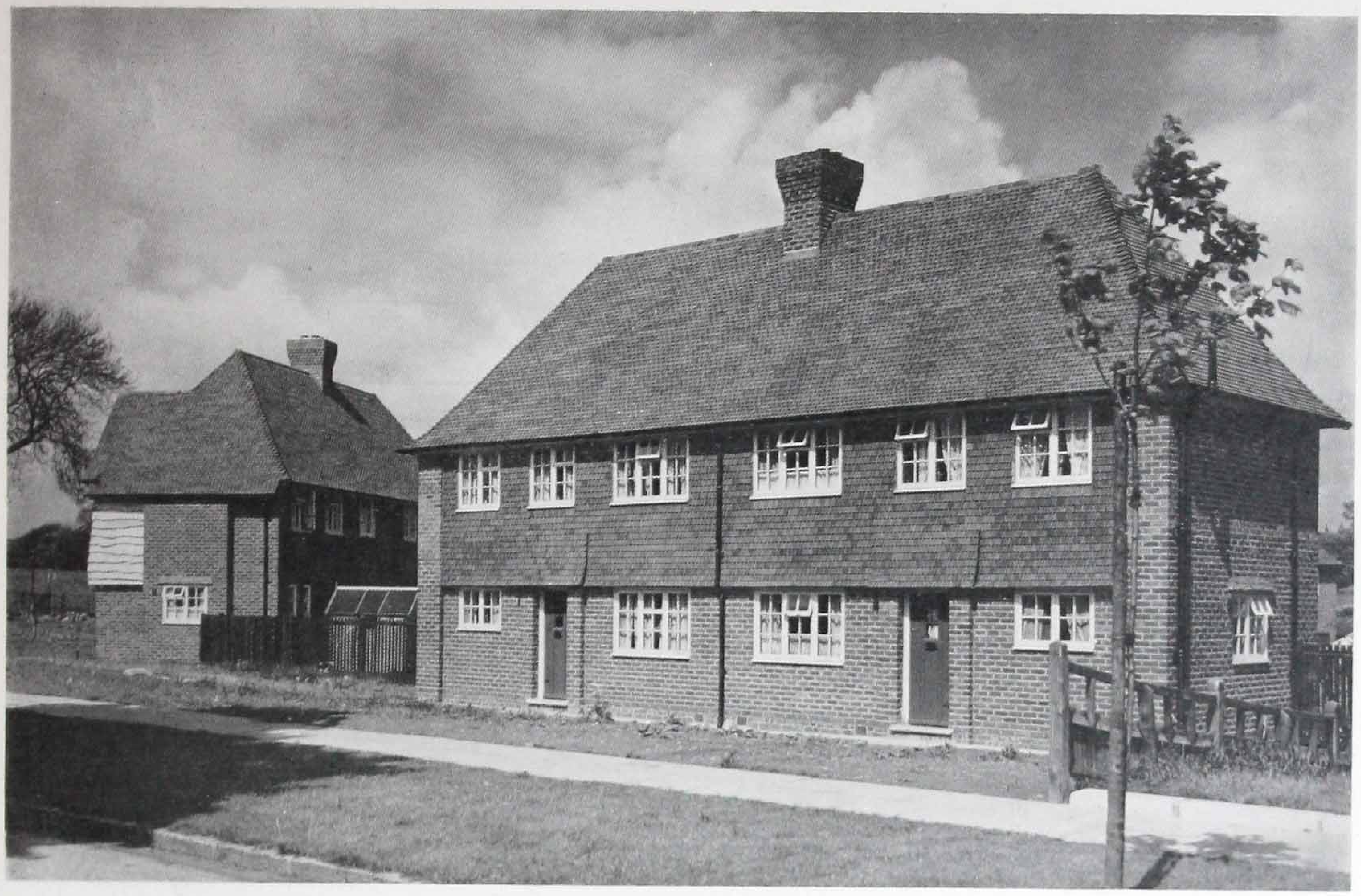
Note that temperatures estimated by Seger's cones are applicable only for a particular speed of firing, with slower rates the estimated temperatures should be less than those scheduled; with the faster rates greater.

We take no responsibility in connection with the fairness or accuracy of the sampling, unless the sampling be done under our own supervision.

In disputes on the *quality* of materials, a case is considerably strengthened if the nature and the amount of the impurities have been determined. Partial analyses are unsatisfactory in Court cases.

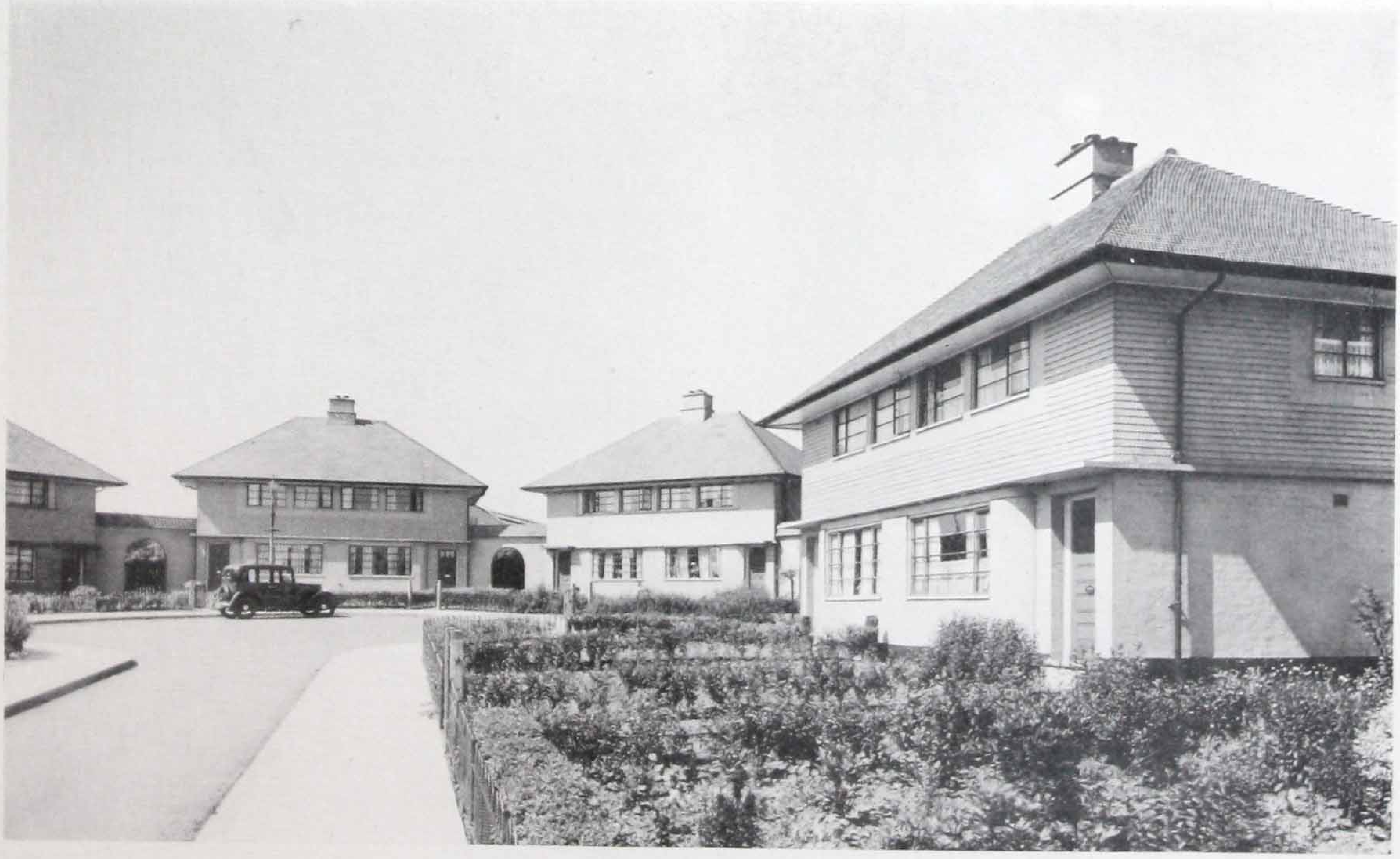
Duplicate copies of this Certificate can be obtained, 6d. each.

H.&A. Ltd.



Weoley Castle Estate

Acme Sandstorm Sandfaced Tiles



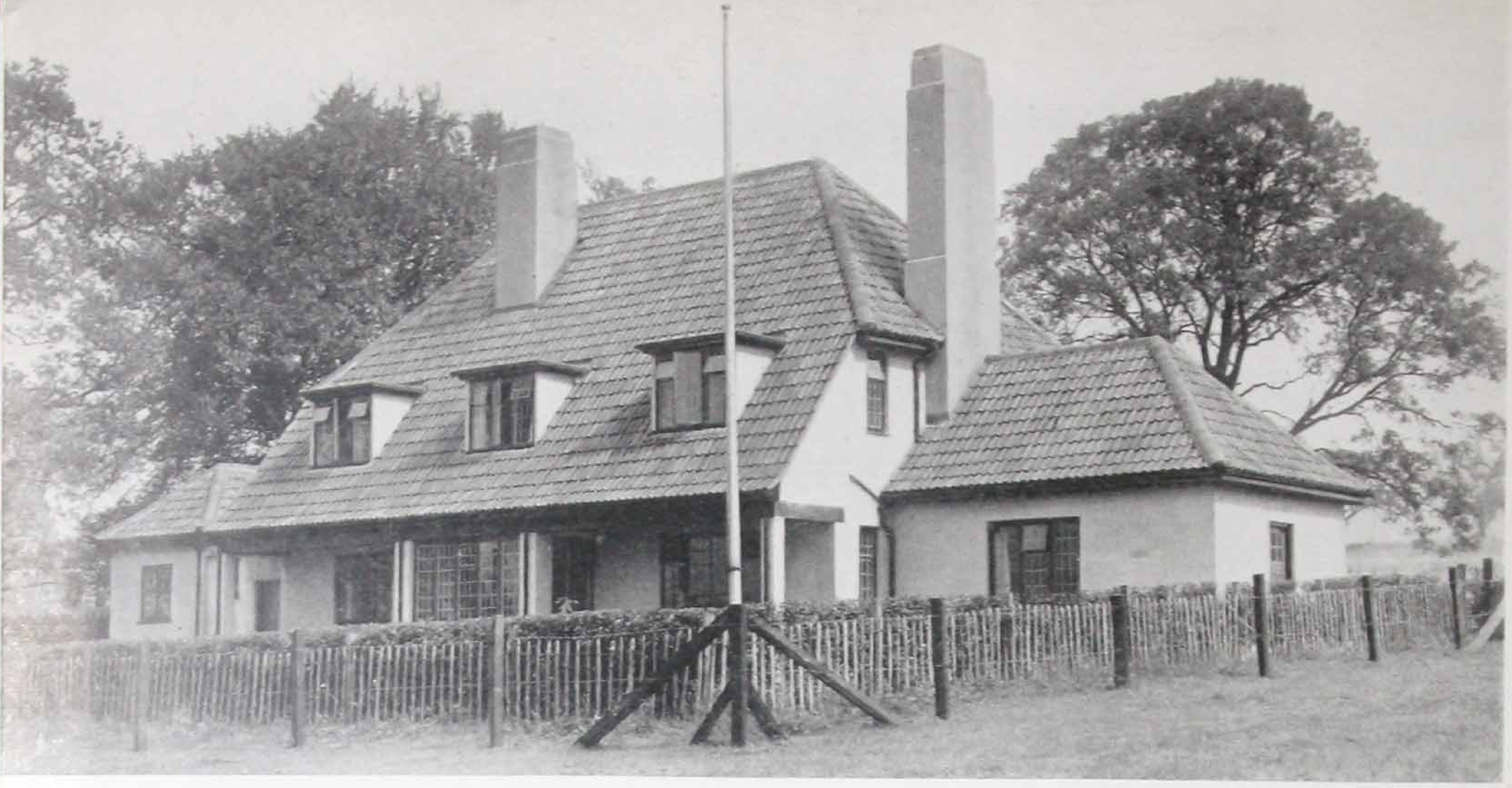
Birmingham Corporation Schemes

Umberslade Road Estate

Acme Sandstorm Sandfaced Tiles

H. J. Manzoni, M.Inst.C.E.
City Engineer and Surveyor

D. H. Davies, Esq., A.R.I.B.A.
Architect

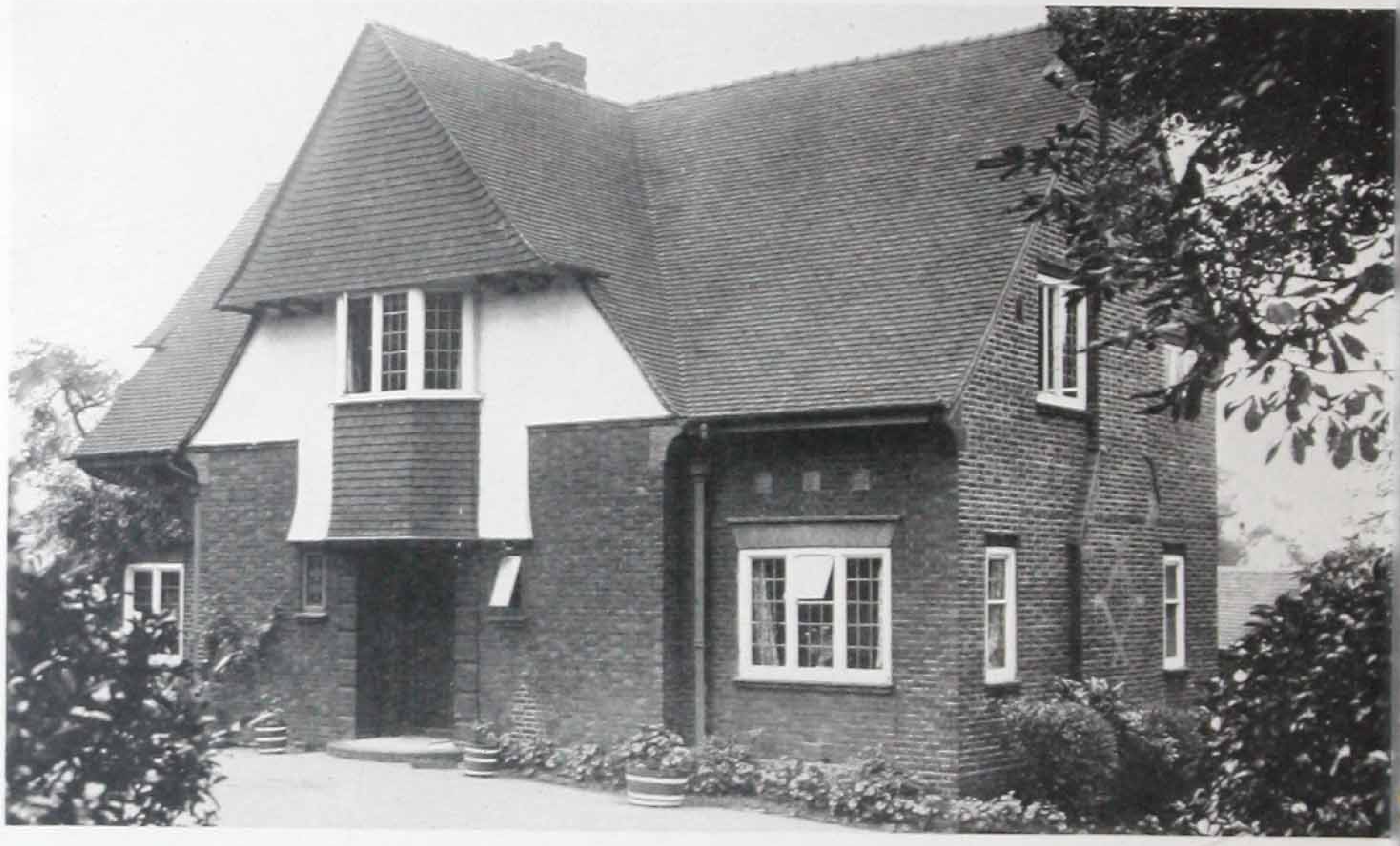


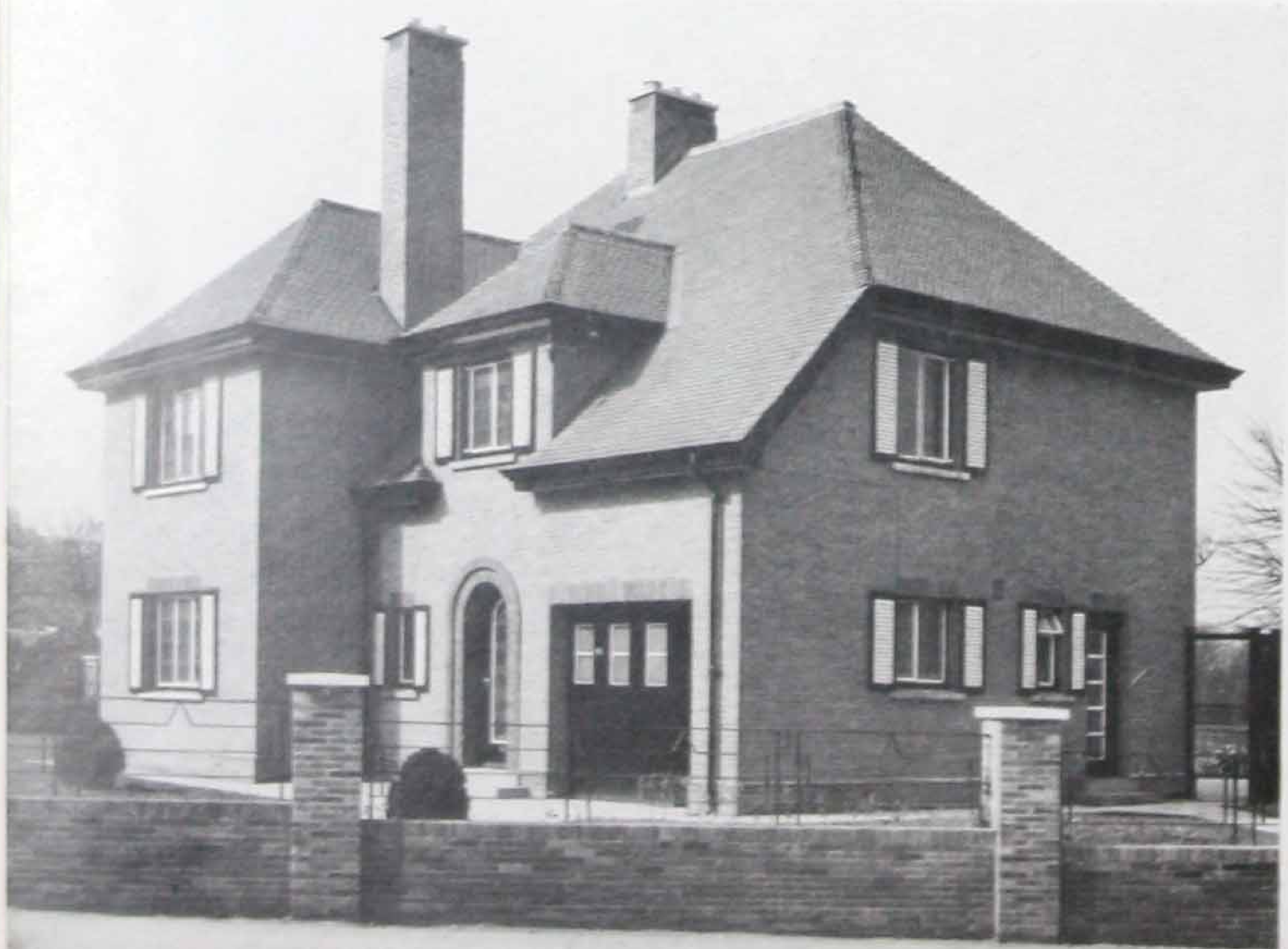
Residence at Seabridge
Wood & Goldstraw, Fs.R.I.B.A.

Double Roman Brindled Tile

Residence at Newcastle
H. Goldstraw, Esq., F.R.I.B.A.

Handmade Acme Century
Purple Tiles

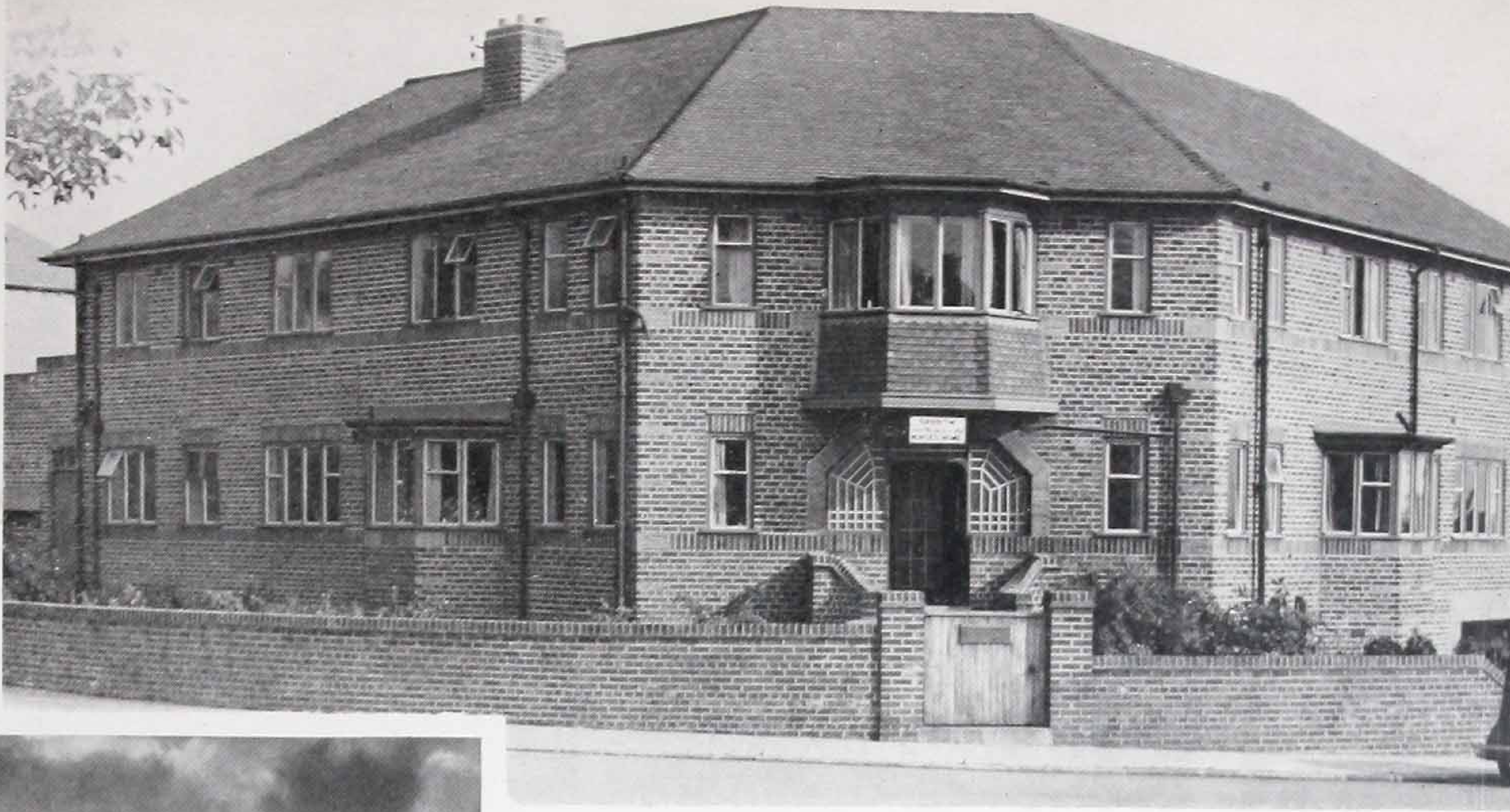


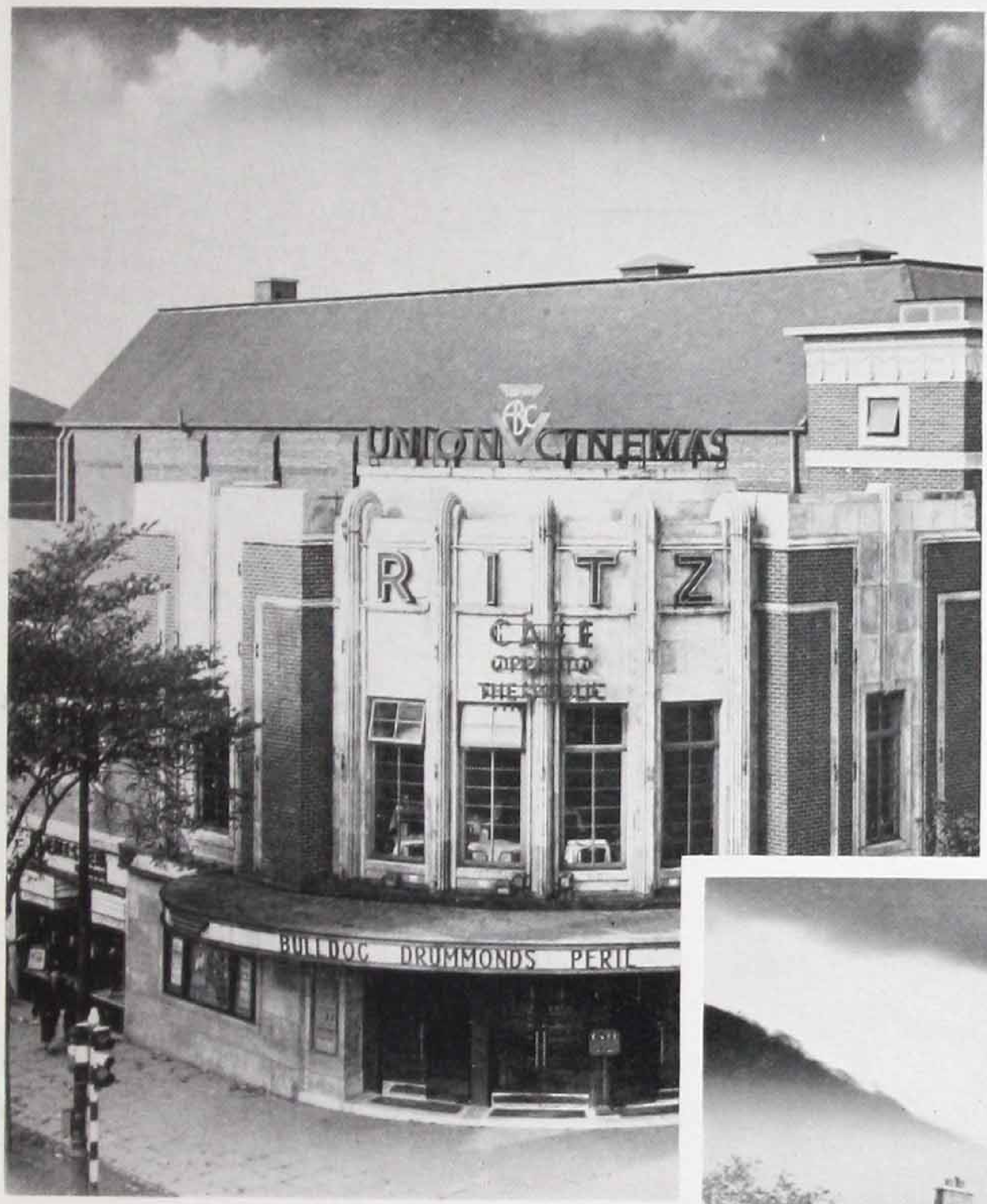


Residence at Wakefield
P. Morris, Esq., L.R.I.B.A.,
City Surveyor

Acme Sandstorm
Russet Brown Sandstorm Tiles

Acme Sandstorm
Red F No. 4 Tiles



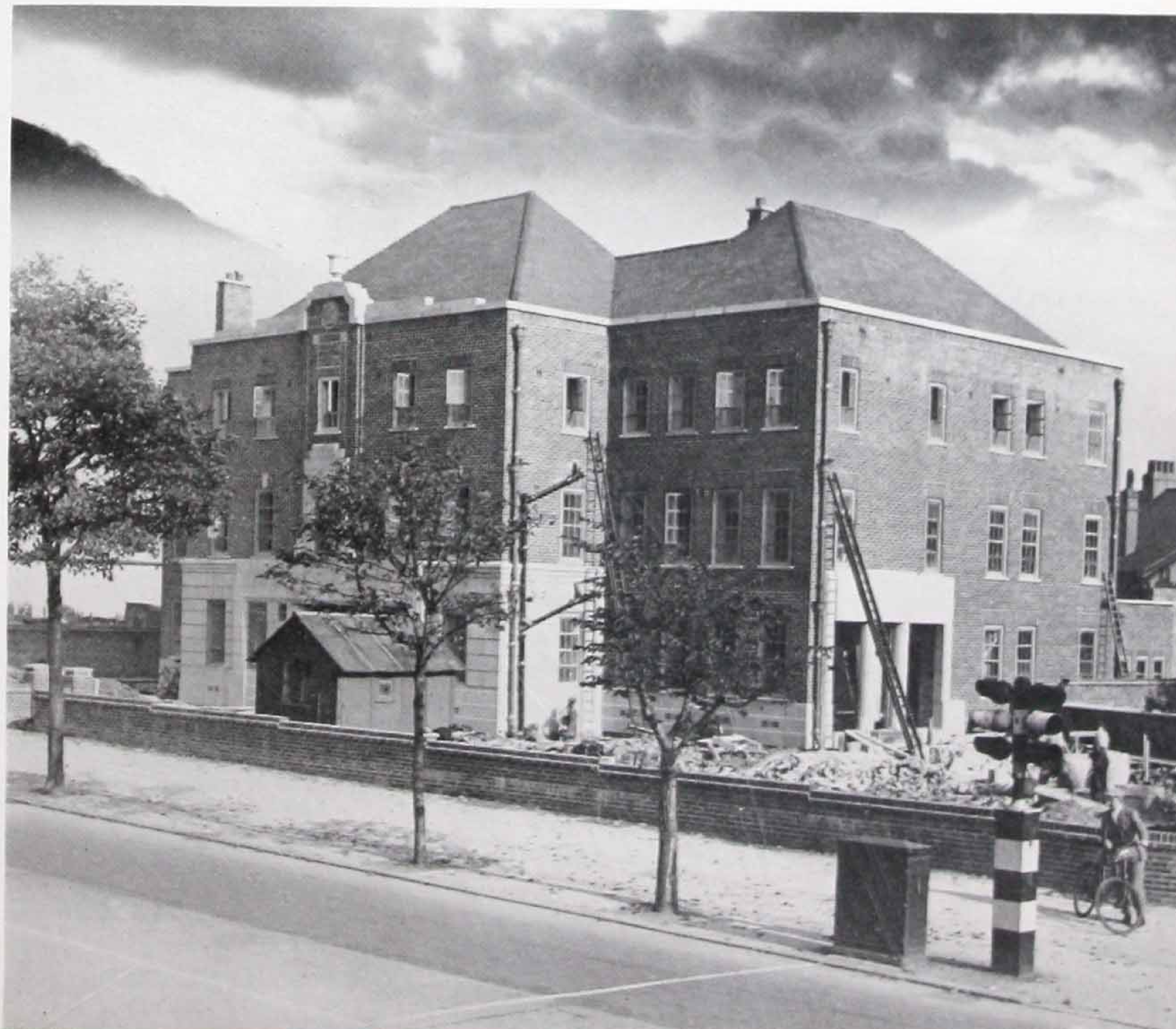


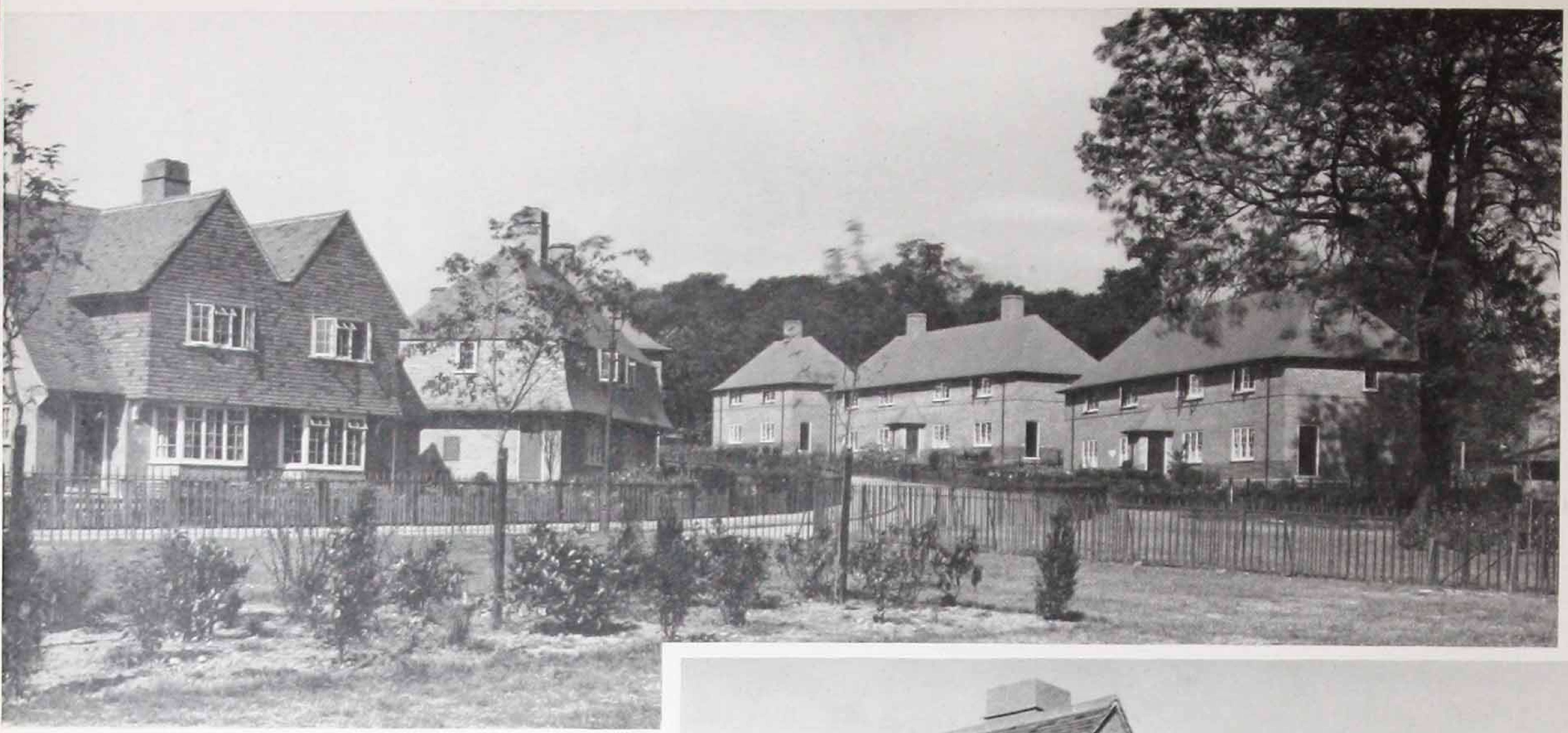
Above : Nurses Home
Centre : Cinema
Below : Hotel

Barrow-in-Furness
G. Whitfield, Esq., F.R.I.B.A.

Acme Century
Purple Machinemade
Sandfaced Tiles

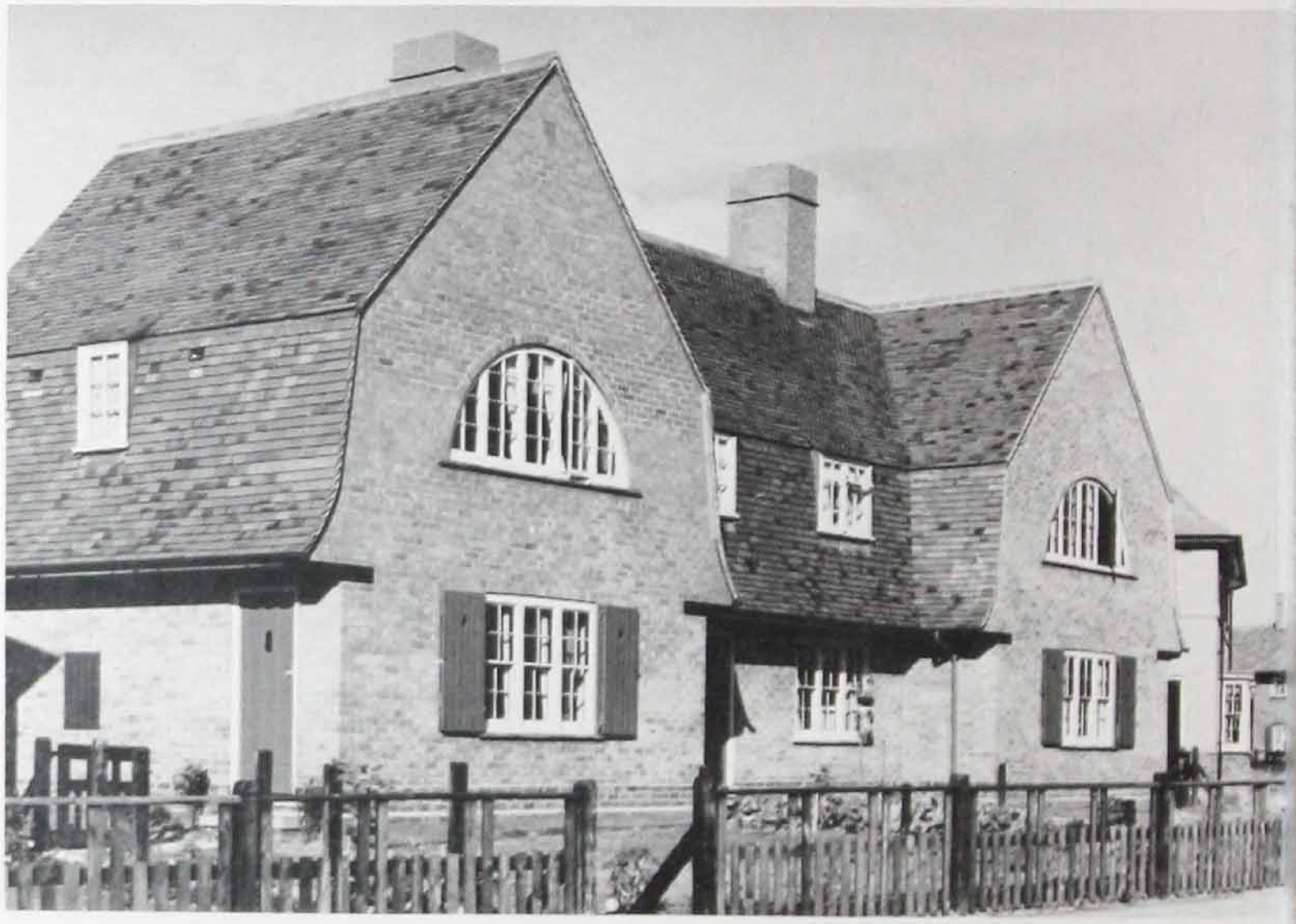
Handmade
Acme Century Tiles

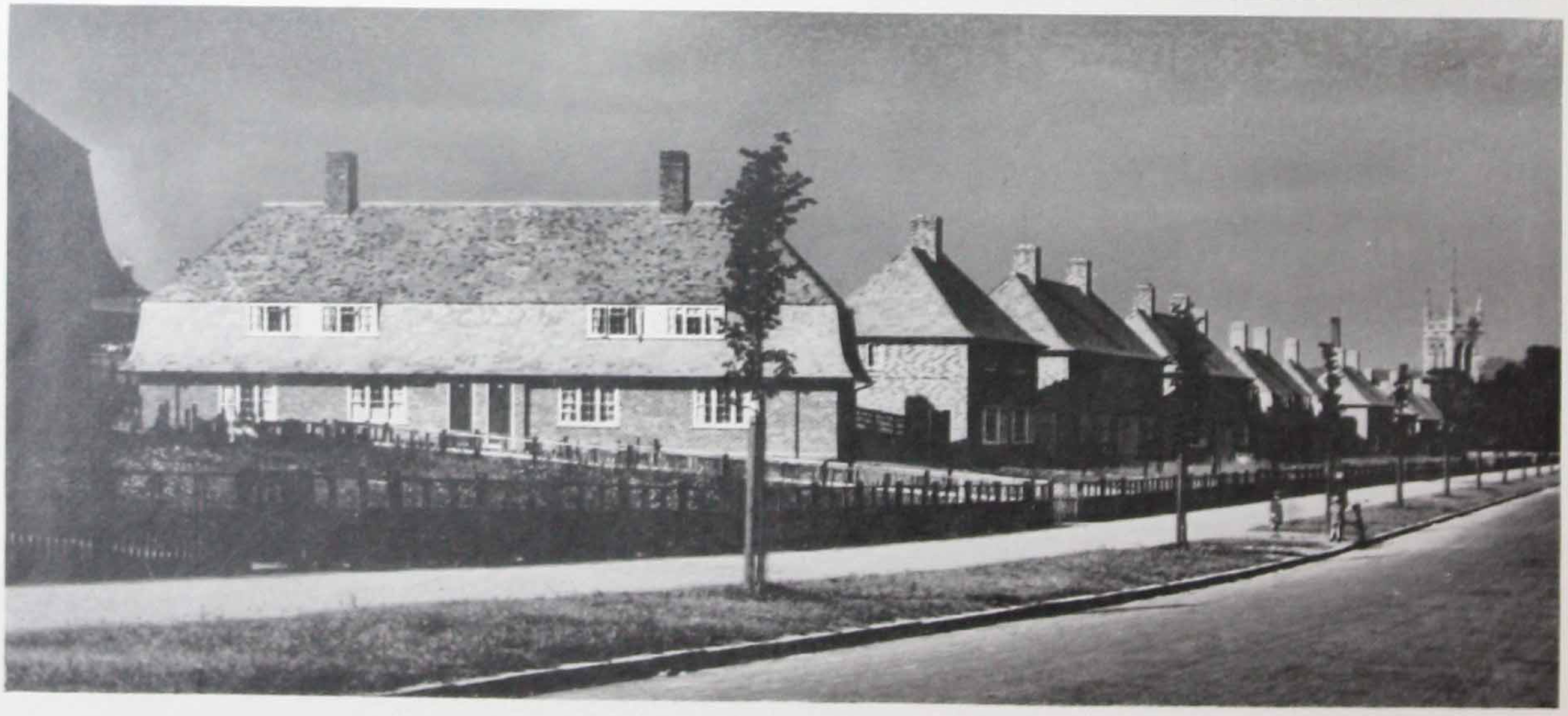


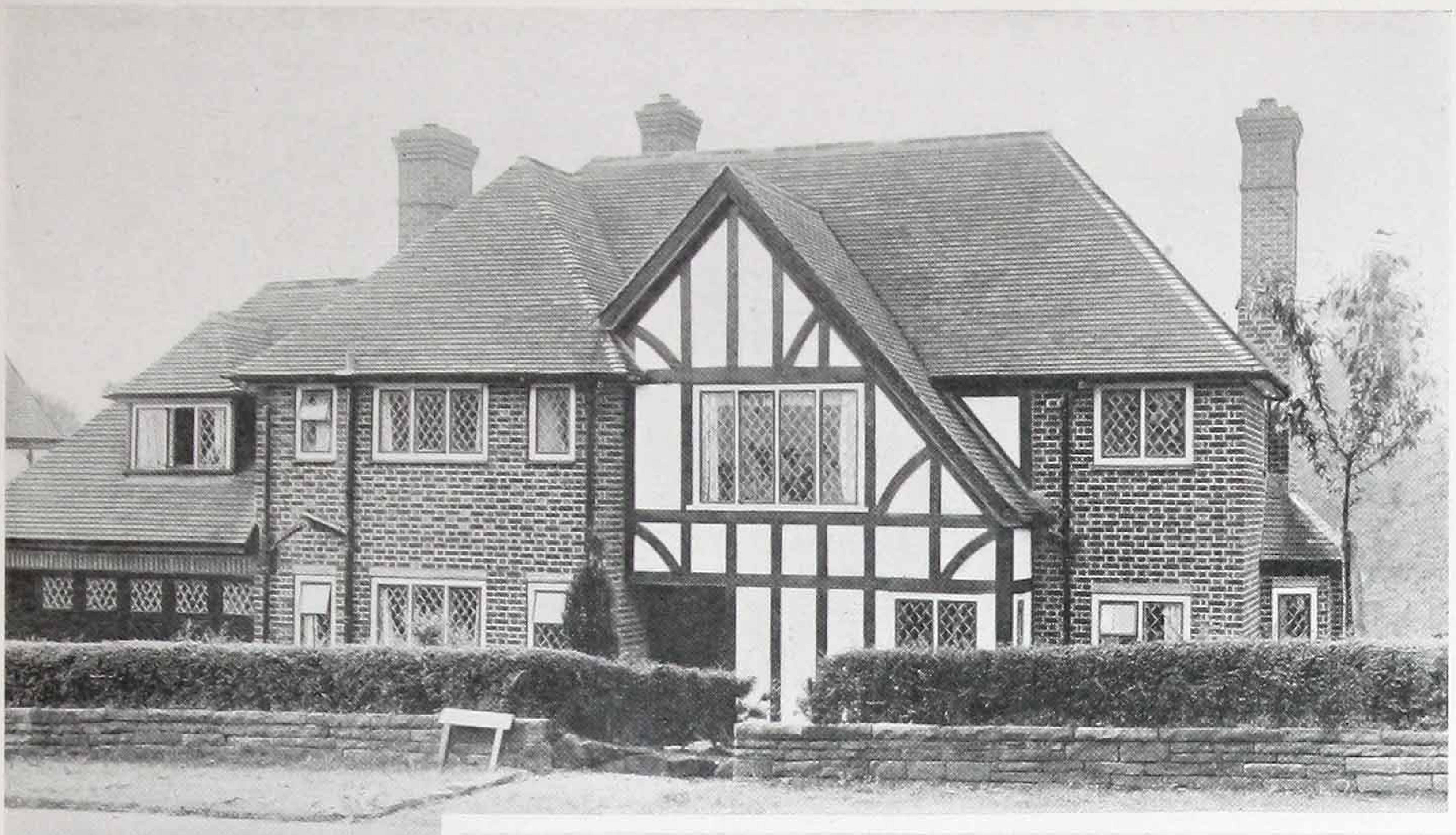


Nottingham Corporation Schemes
E. Phillips, Esq., L.R.I.B.A., City Architect

Mixed Brindled Acme Tiles

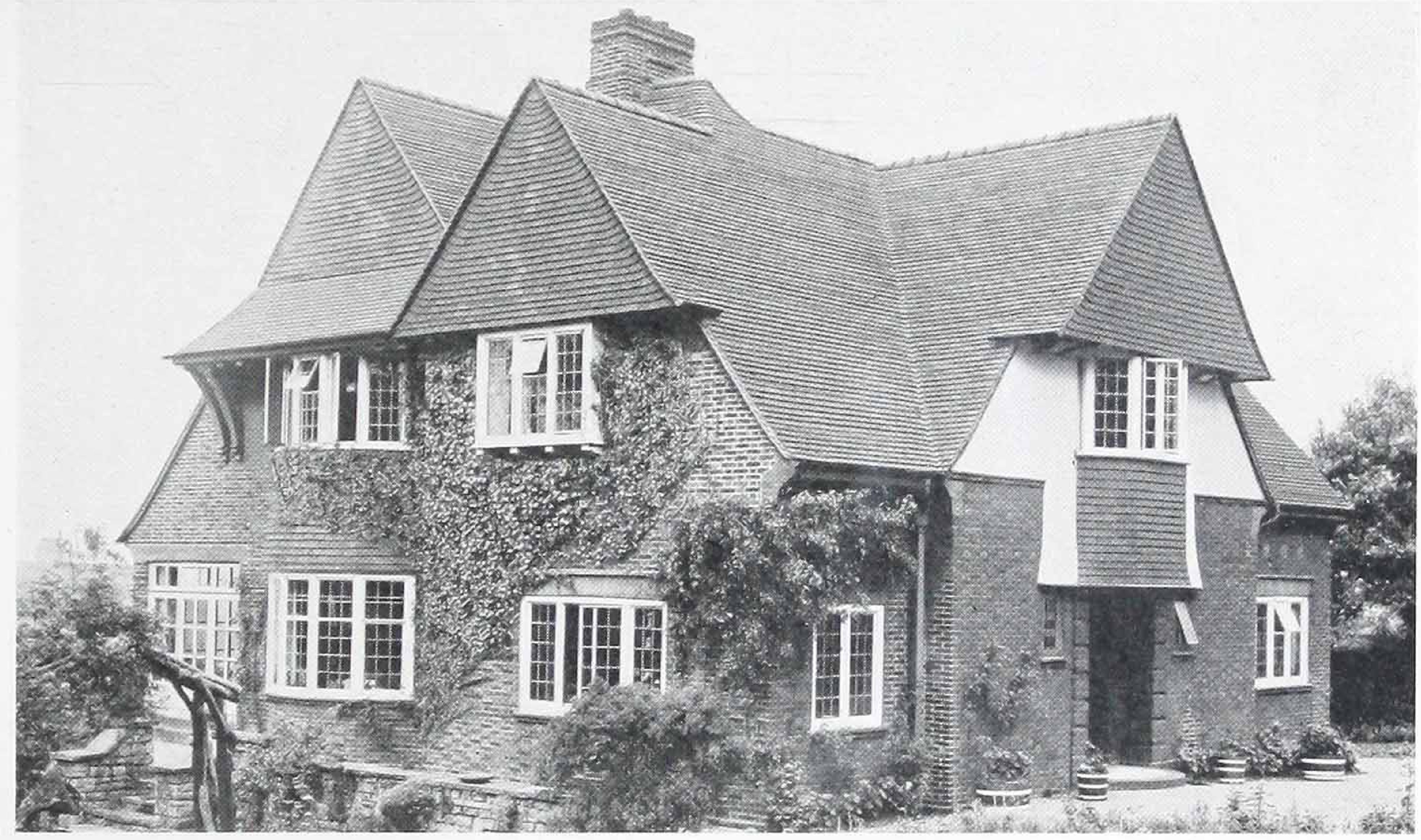






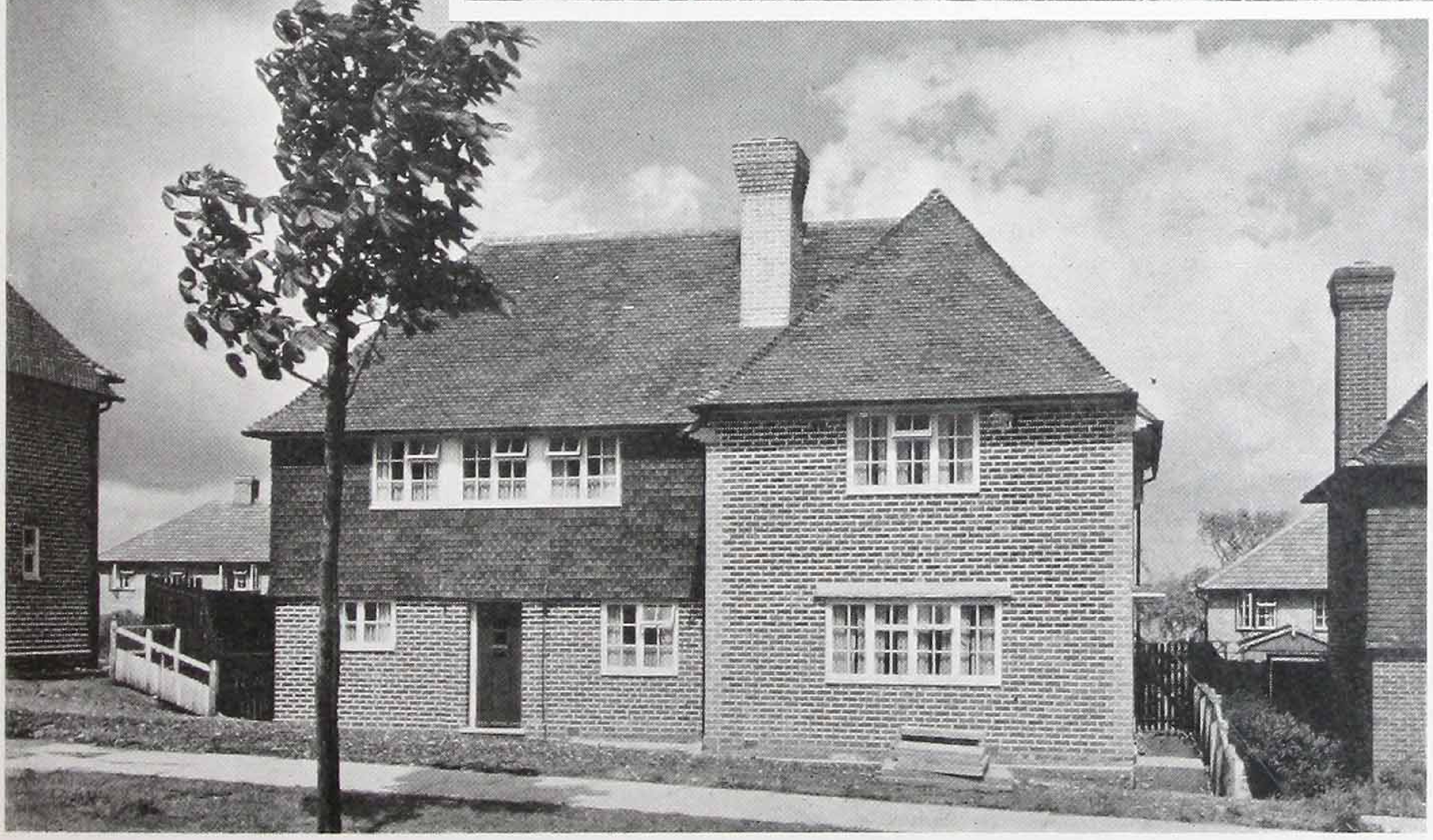
Residence at Dairyfields
Wood & Goldstraw, Fs.R.I.B.A.

Mauve Tints
Sandstorm Tiles



Residence at Newcastle
H. Goldstraw, Esq., F.R.I.B.A.

Red F Sandstorm Tiles

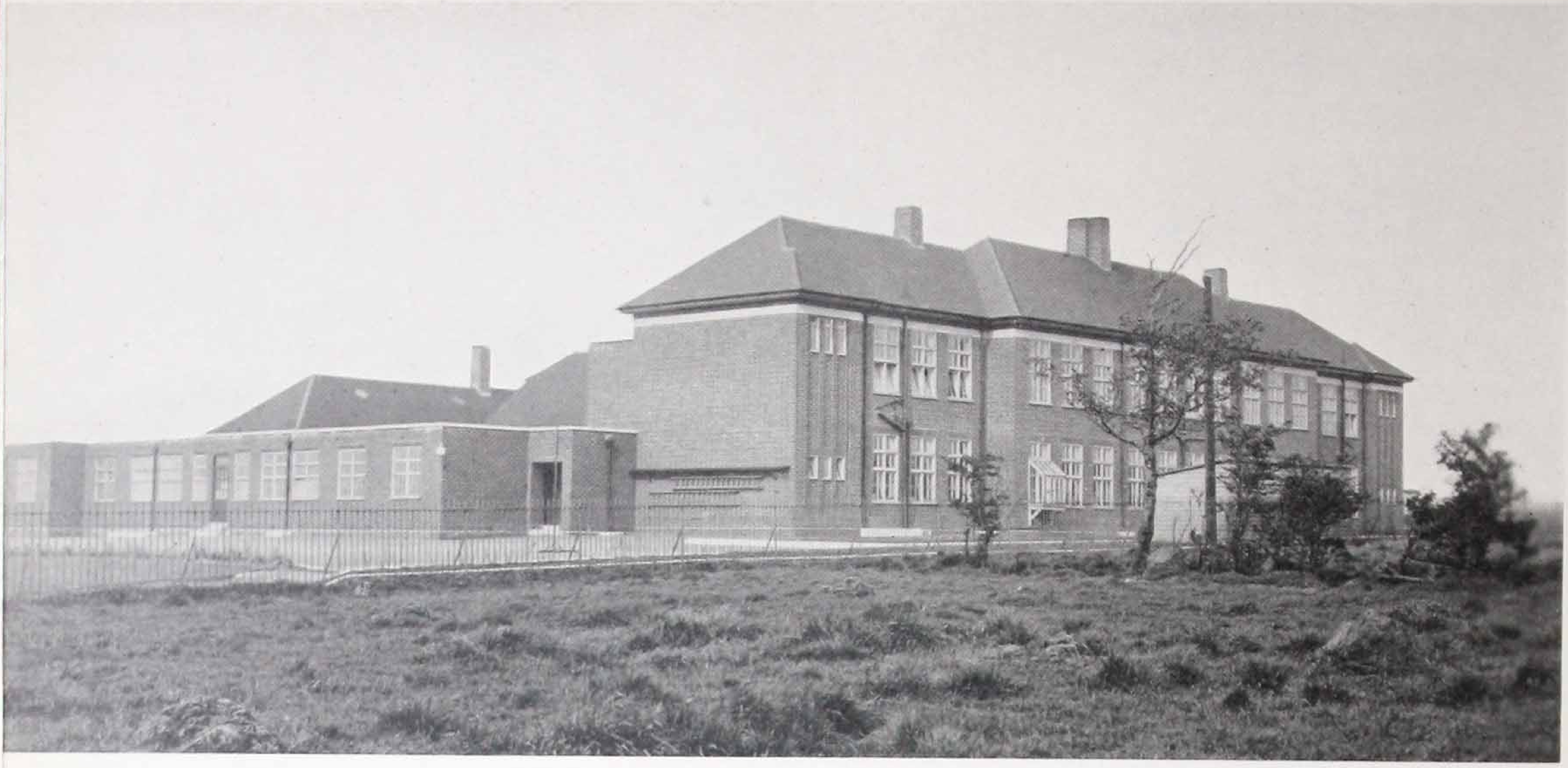


Birmingham Corporation Scheme
Weoley Castle Estate

H. J. Manzoni, M.Inst.,C.E.
City Engineer and Surveyor

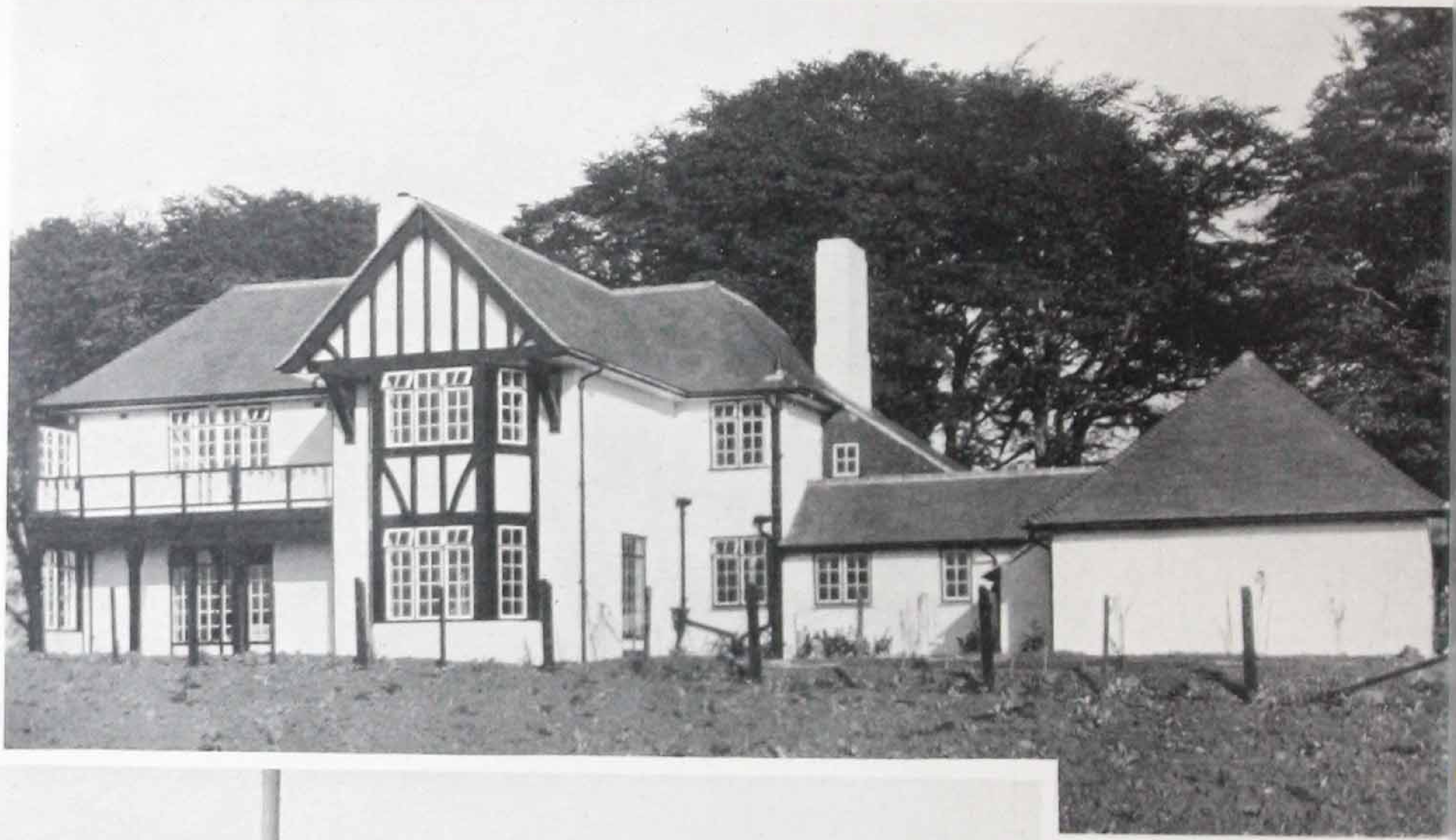
D. H. Davies, Esq., A.R.I.B.A.
Architect

Acme Sandstorm
Red "F" Tiles



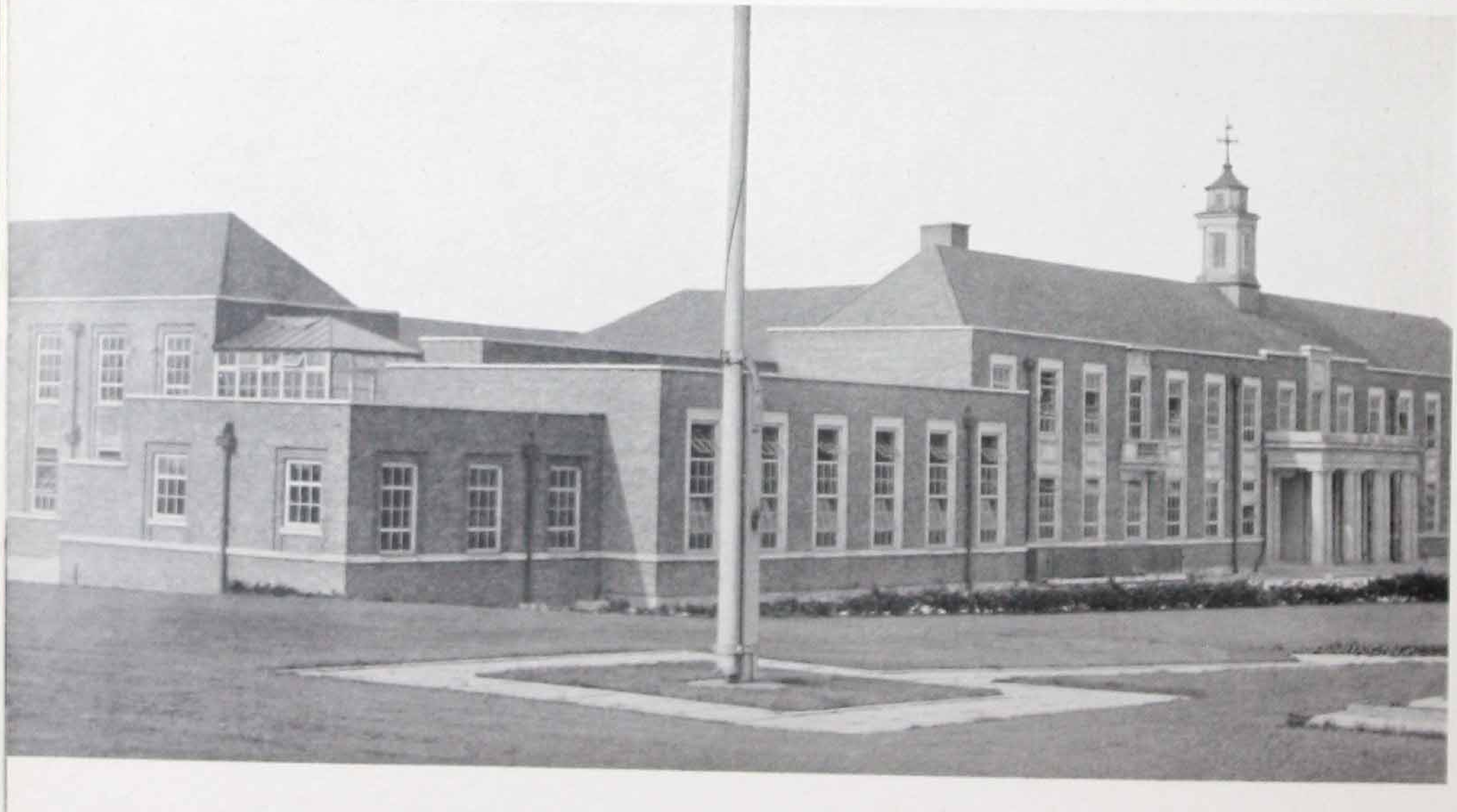
Cellarhead School
Col. G. C. Lowbridge, F.R.I.B.A., Architect to the County Education Committee

Russet Brown
Handmade Tiles



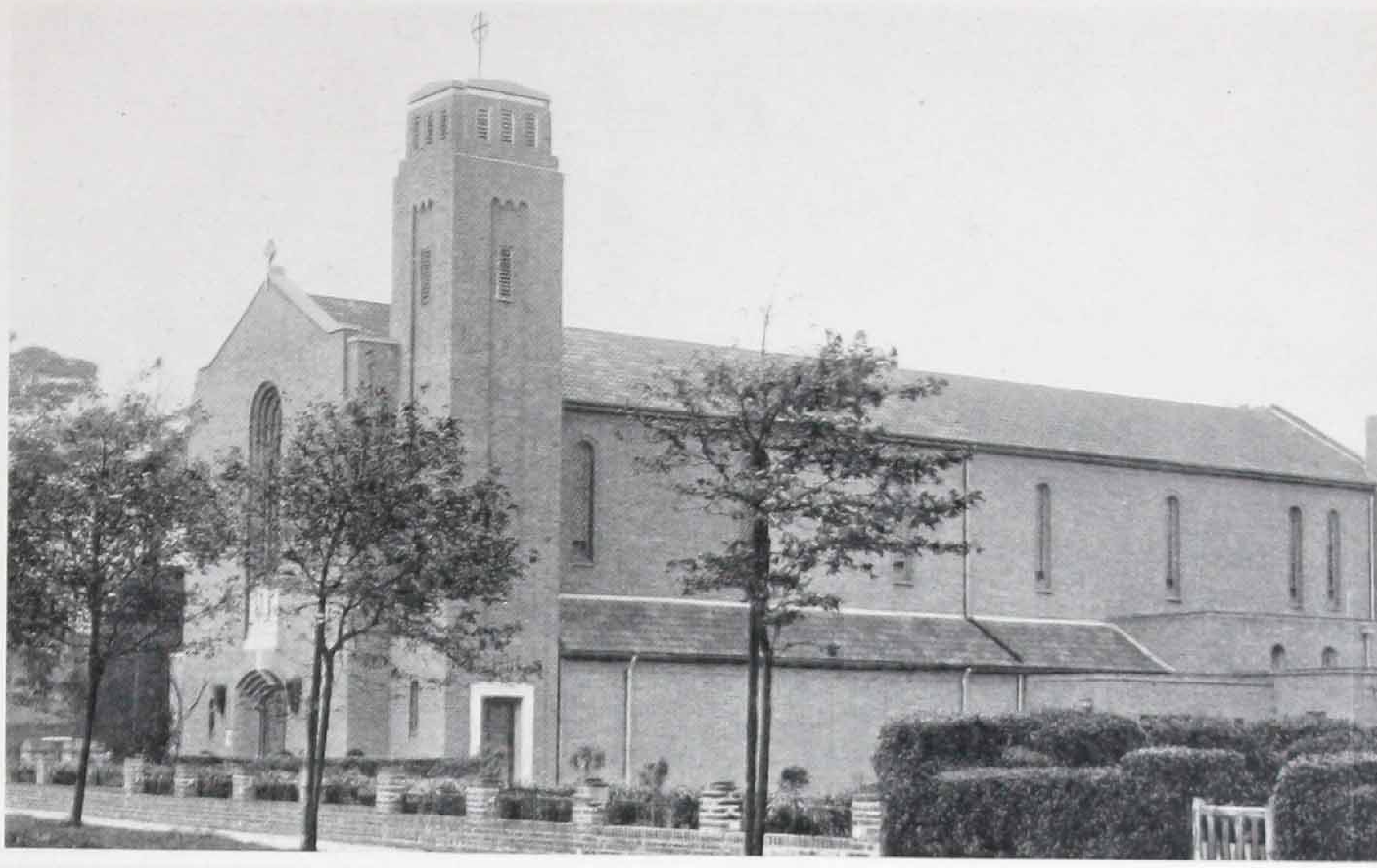
Residence at Butterton
Wood & Goldstraw, Fs.R.I.B.A.

Blue-Black Handmade Tiles



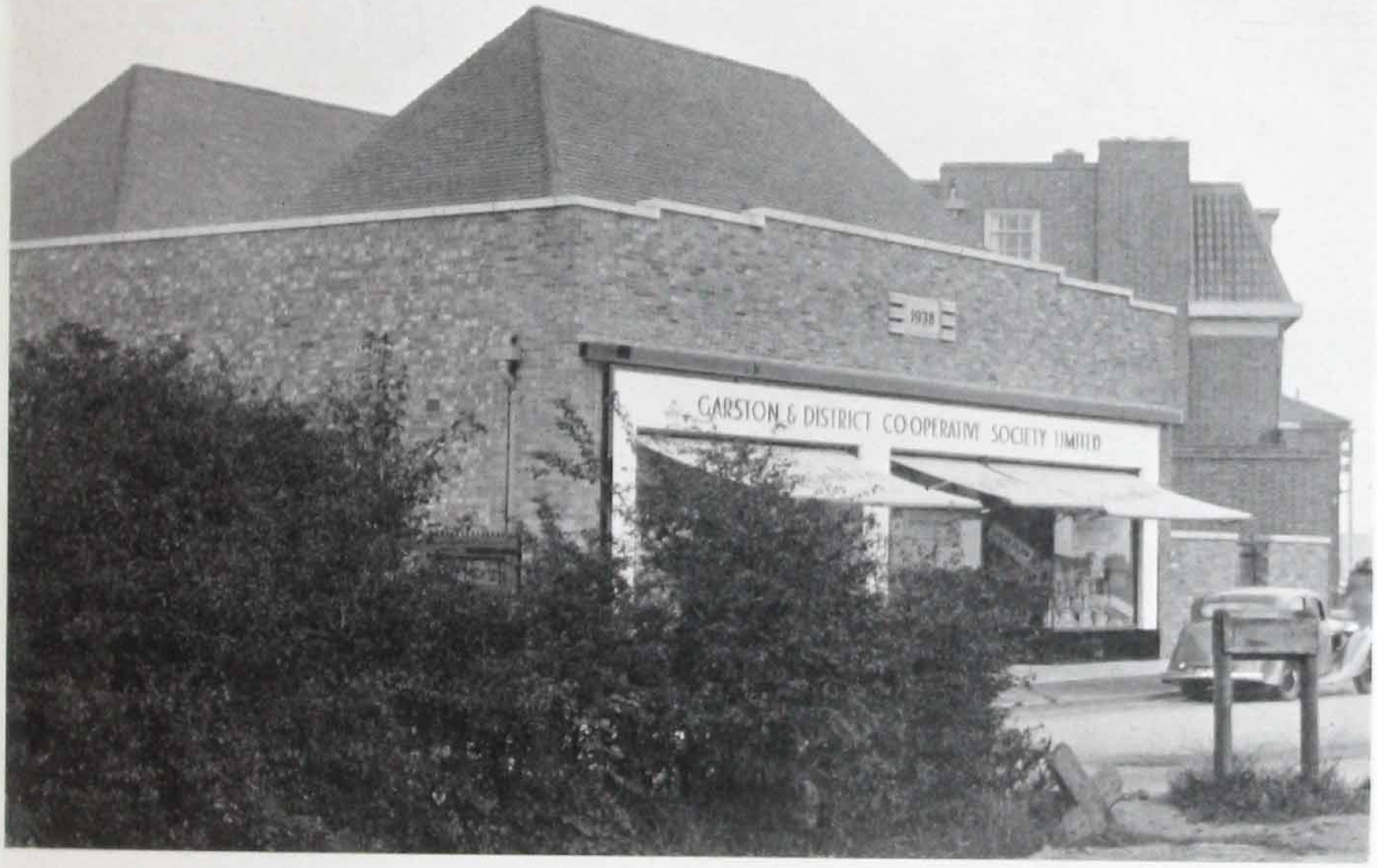
Holt High School, Liverpool
City Land Steward

Lightmoor
Dark Brindled
Broseley Tiles



St. Bernadette Church,
Liverpool
Hill, Sandy & Norris, Fs.R.I.B.A.

Best Double Roman Tiles

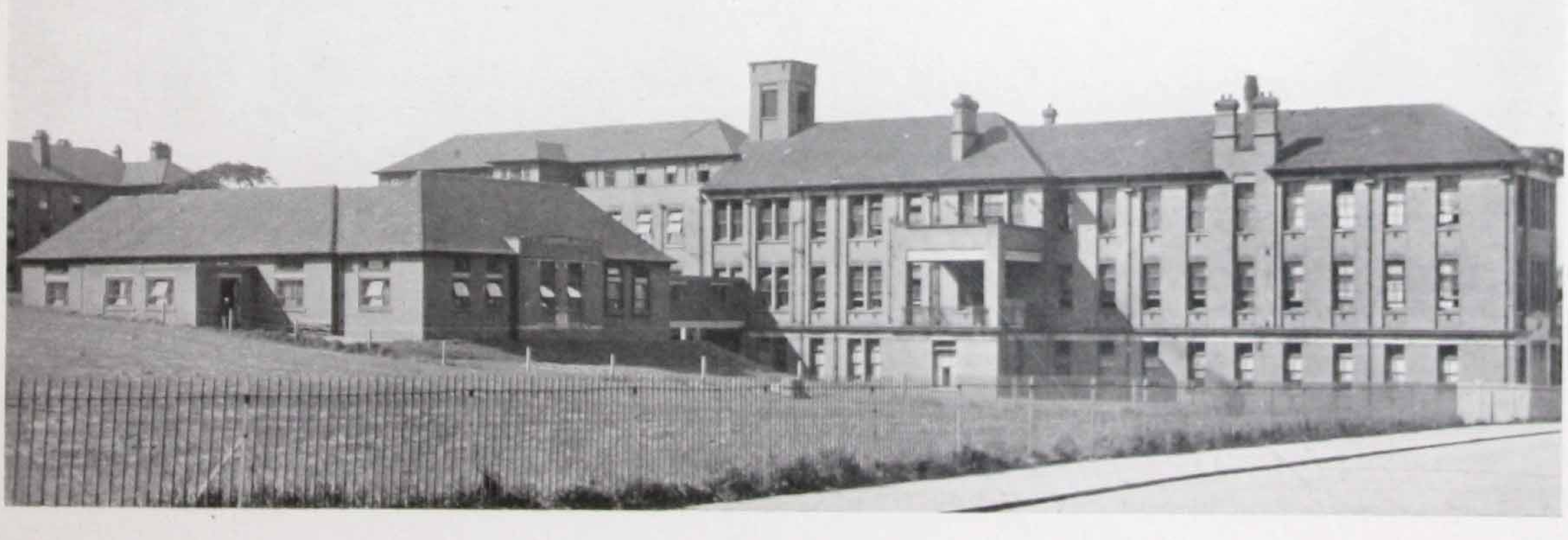


Shop at Garston
A. Johnson, Esq., A.R.I.B.A.

Red "F" Sandstorm Tiles

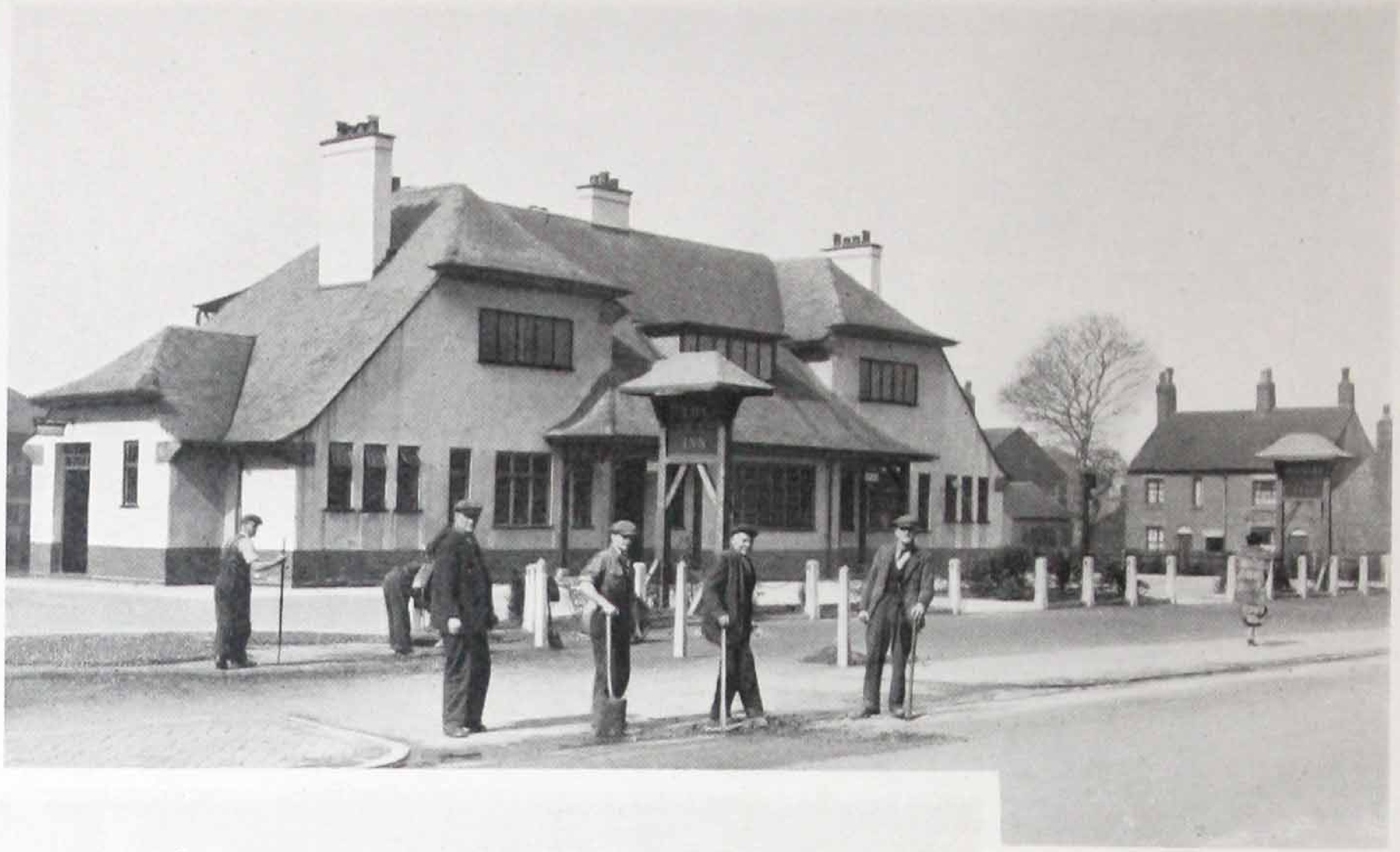
N. S. Royal Infirmary Extension
Wood & Goldstraw, Fs.R.I.B A.

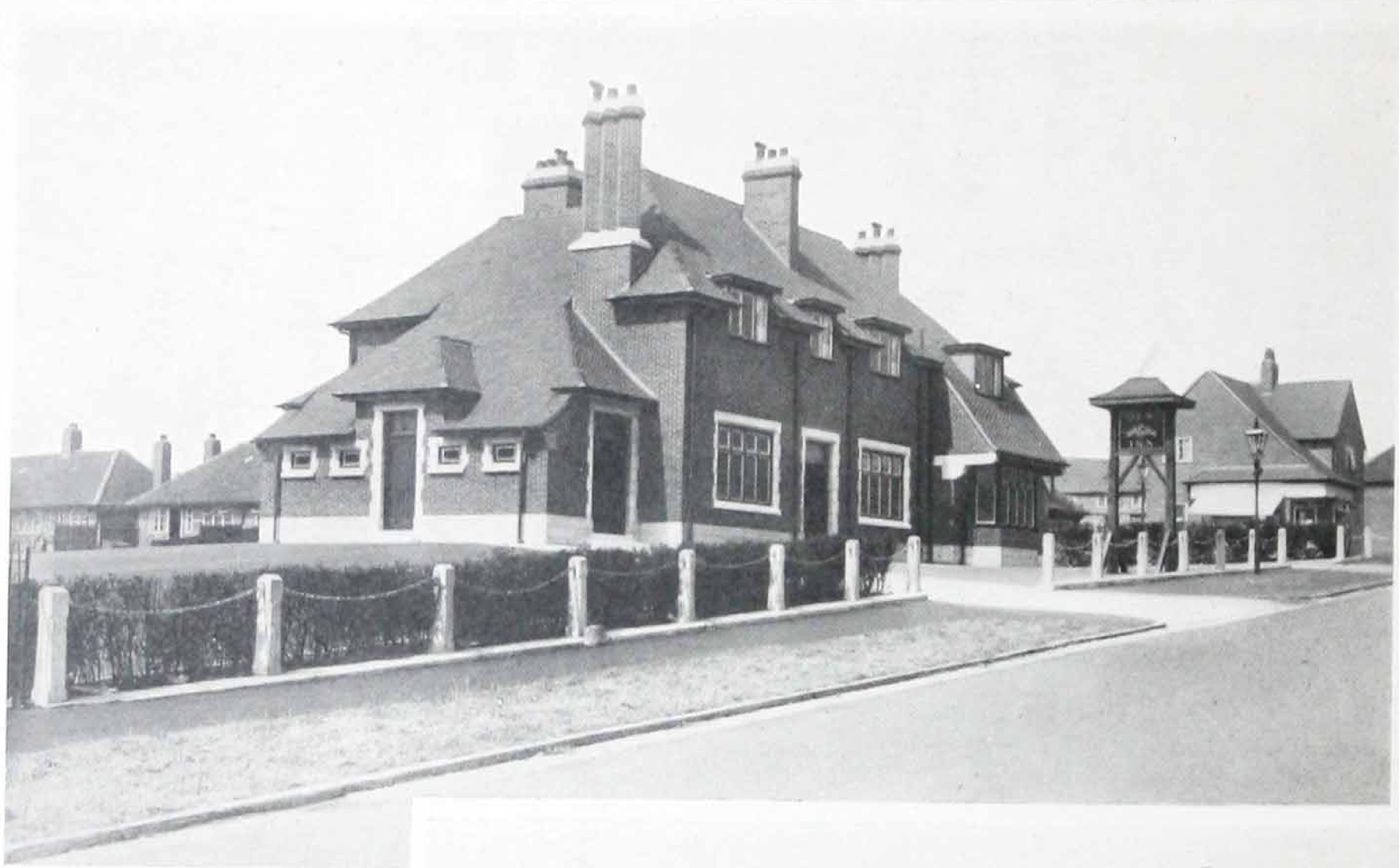
Tudor Sandstorm Tiles



Swan Hotel, Trent Vale
R. Scrivener & Sons, Fs.R.I.B.A.

Green Handmade Tiles



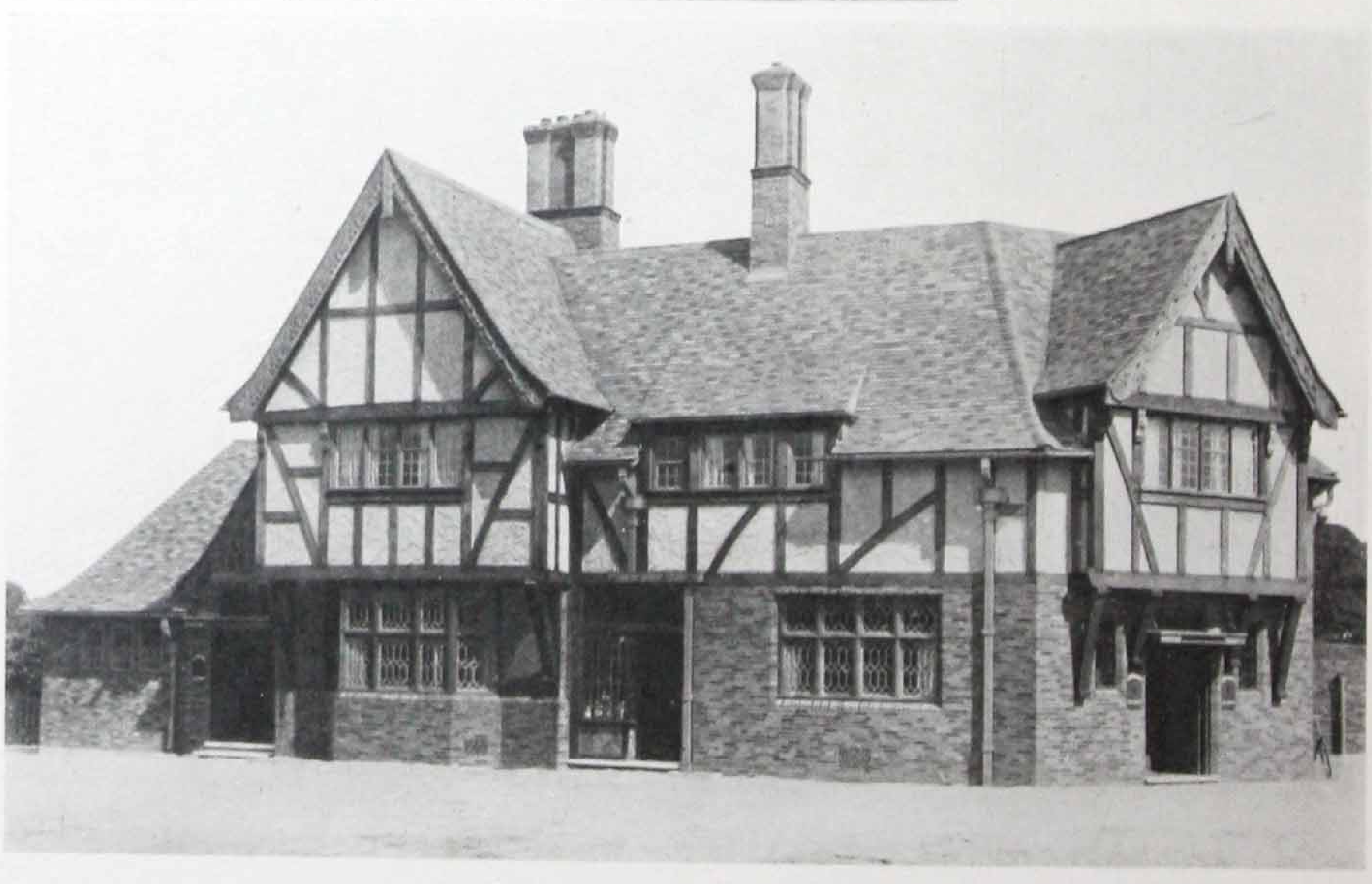


New Inn, Knutton
R. Scrivener & Sons, Fs.R.I.B.A.

Red Medium Handmade Tiles

Cauldwell Arms, Talke
Wm. Blair, Esq., F.R.I.B.A.,
Architect to Ind Coope
and Allsopp Ltd.

Cotswold Smoky Rustic
Handmade Tiles



TECHNICAL AND STATISTICAL INFORMATION

A good Roofing Tile demands the same care and thought in its fixing as in the production. In the following pages we publish data which cannot fail to interest all those who are concerned in Roofing Problems, and in particular the refinements thereof. These contain extracts from Bulletins of the Clay Products Technical Bureau of Great Britain, the Building Industries National Council Handbook, while the Tables of angles are reproduced by permission of Mr. L. G. Tomlinson of Messrs. Wheatly & Co. Ltd., Stoke-on-Trent. We are indebted to all three sources for their courtesy in allowing us to make use of this valuable information.

Code of Practice for Roof Tiling with Plain Tiles

(*Extract from the Building Industries National Council Handbook*)

Preamble

The CODE defines the minimum requirements for roof tiling. The recommendations are aimed to secure the greatest economy consistent with proper performance of the roof. The CODE throughout expresses minimum requirements, and, as such, they can be increased where greater security against penetration or greater insulation is required, or for æsthetic reasons.

The CODE must be regarded as in no way antagonistic to local traditions and practice where such represent something in excess of the requirements of the CODE. It is also recognised that, in certain of the more elevated parts of the country or near the coast, conditions prevail which can only be met by some special form of structural treatment, but in such cases the CODE may still be regarded as the foundation of whatever special measures may be specified to meet those special conditions.

Tiles

1. QUALITY OF TILES.

The tiles shall comply with the requirements of the appropriate British Standard Specifications. The Specification at present in force is:—

No. 402 Clay and Marl Hand or Machine-made Tiles.

Pitch and Lap

2. PITCH OF ROOFS

The pitch of common rafters must be not less than 40 degrees.

3. SPROCKETED EAVES

The pitch of sprocketed eaves must be not less than 40 degrees.

> NOTE.—The reduction of the slope at sprocketed eaves below 40 degrees is inadvisable. An effective pitch at the eaves is especially necessary, since this part of the roof is subjected to a greater volume of water flowing over its surface than the main area of the roof. This position involves—
>
> (a) The greater risk of penetration ;
> (b) Risk of the reduced life of the tiles.
>
> The former may be guarded against by the provision of felt, but it is considered that the performance of eaves at less than 40 degrees pitch cannot be sufficiently assured to justify the recommendation of a lower pitch in a code of minimum practice.

4. LAP

The " lap " of plain roofing tiles is the amount by which the tail of a tile overlaps the head of the tile next but one below. The minimum lap of tiles must be 2½ inches. In more elevated sites, however, or on sites where more than normally severe conditions prevail, the minimum lap must be 3 inches.

Nails and Nailing

5. NAILS. GENERAL

Nails must have substantial heads, and must be of galvanised steel or iron, zinc, copper or yellow metal, and the order in which they are named is to be accepted as the order of increasing durability. In special cases, such as gas retort houses, chemical factories, etc., none of the types of nails mentioned will necessarily be satisfactory. In such special circumstances, therefore, special provision for fixing must be made.

6. GALVANISED NAILS

Galvanised nails must consist of steel or iron coated with zinc by dipping in molten zinc (spelter) at a suitable temperature. Galvanised nails must be not less than 1½ inches long and No. 12 gauge thickness.

> NOTE.—Galvanised nails are adequately durable for use in rural or in urban districts where the atmospheric pollution is not high. In situations where the atmosphere is highly polluted, or on sites near the coast, or in normal sites where a higher degree of durability is demanded, galvanised nails are not suitable.

7. ZINC NAILS

Zinc nails must be cut from sheets of metallic zinc, and must have a sufficiently substantial head formed in a die. Zinc nails must not be less than 1½ inches long, and the minimum weights of cut zinc nails must be in accordance with the following table :—

1½ inch	5 lb. per 1,000
1¾ inch	7 lb. per 1,000
2 inch	9 lb. per 1,000

> NOTE.—Zinc nails are not suitable for use on sites near the sea coast.

8. COPPER NAILS

Copper nails must consist of metallic copper, and must be either formed from wire or cut from sheet. Copper nails must not be less than 1½ inches long and No. 12 gauge thickness. The minimum weights of copper nails must be in accordance with the following table :—

1½ inch	5 lb. per 1,000
1¾ inch	7 lb. per 1,000
2 inch	9 lb. per 1,000

9. CAST YELLOW METAL NAILS

Yellow metal nails must be cast from an alloy approximating to the following composition :—

63 per cent copper.
36 per cent zinc.
1 per cent tin.

Yellow metal nails must not be less than 1½ inches long. The minimum weights of cast yellow metal nails must be in accordance with the following table :—

1½ inch	7 lb. per 1,000
1¾ inch	9 lb. per 1,000
2 inch	12 lb. per 1,000

> NOTE.—Yellow metal nails are the most durable of the four types mentioned, and are harder and more easily driven than copper. They must be used in all cases where the atmospheric conditions are deleterious to the other types of nails.

10. NAILING

The tiles must be nailed every fifth course on roofs situated on " normal " sites and every third course on more exposed sites.

> NOTE.—Reference should be made to the special minimum requirements (Clause No. 11) with respect to steeply-pitched roofs and mansard roofs.

11. NAILING ON STEEPLY-PITCHED ROOFS AND MANSARD ROOFS

On ordinary or mansard roofs at pitches of 50-55 degrees every third course of tiles must be nailed; on pitches of 57½-60 degrees the tiles must be nailed with one nail to every tile in each course; and on pitches steeper than 60 degrees and on vertical surfaces the tiles must be nailed with two nails to every tile.

12. NAILING AT VERGES, EAVES, ETC.

At verges, and at each side of valleys and hips and where a roof meets an abutment along an inclined line, two tiles in each course shall be nailed. At eaves, top-courses and where a roof meets an abutment along a horizontal line, two courses of tiles shall be nailed.

13. NAILING OF NIBLESS TILES

Nibless tiles must be nailed with two nails to each tile.

Verges, Eaves and Abutments

14. BEDDING AT VERGES

At verges the tiles must be bedded in mortar of one of the following types :—

Cement and sand.
Strong hydraulic lime and sand.
Gauged lime (*i.e.*, lime and cement) and sand.

NOTE.—The bedding must be applied during the fixing of the tile, the bedding being struck off smoothly, the tile must not be merely pointed with mortar after fixing.

15. OVERHANGING EAVES

In cases where the eaves overhang the brickwork and there is no soffitboarding, the rafters must be close boarded for the length of the overhang.

16. FINISHING AT ABUTMENTS

Finishing at abutments must be by means of lead step-flashing with lead or zinc soaker, copper step-flashing with copper soaker, or, alternatively, lead or zinc soakers with lead cover-flashing. Both step and cover-flashing must be well tucked into joints of brickwork or grooves in masonry or concrete, as the case may be.

Where tile fillets are used, the brickwork or masonry must be chased to such a depth that the upper edge of the tile is covered. Tile fillets must be bedded and set in a mortar of one of the types described in Clause 14. Cement fillets must not be used.

Bedding of Ridge and Hip Tiles

17. BEDDING OF RIDGE TILES

Ridge tiles, where used as ridge or hip tiles, must be bedded on and properly pointed with one of the mortars mentioned in Clause 14.

18. BEDDING AND NAILING OF HIP TILES

(a) CLOSE-FITTING HIP TILES

Close-fitting tiles must be secured by a nail in each tile, and the nail must penetrate at least 1 inch into the hip rafter. The tiles must be bedded AT THE HEAD ONLY, on a mortar of one of the types described in Clause 14.

(b) BONNET HIP TILES

Bonnet hip tiles must be similarly nailed, and must be bedded in the manner prescribed for Ridge Tiles in Clause 17.

19. VALLEY TILES

Valley tiles must not be bedded.

Felting, Boarding and Battening

20. Felting, Boarding and Battening

Methods of Roof construction, in their ascending order of value, are :—

(i) Tiles laid on open battens (suited to fairly sheltered sites only),
(ii) Rafters, felt and battens,
(iii) Rafters, plain edge boarding, counter-battens and battens,
(iv) Rafters, plain edge boarding, felt, counter-battens and battens.

The use of feather-edge boards is not recommended.

Note.—The functions of felting and boarding are to prevent the flow of air through the roof space, so reducing the liability to penetration of rain and the infiltration of snow and soot. The provision of felt, suitably lapped, ensures that any rain or snow driven over the tiles in severe exposures shall drain harmlessly into the eaves gutter. The use of boarding increases the thermal insulation of the roof space, partly by virtue of its own thermal insulation and partly by preventing flow of air through the roof space. Felting used alone exerts a useful effect in this respect by preventing draughts through the roof. To ensure good durability there must be free circulation of air around the tiles. For this reason, torching, unless carried out by thoroughly experienced craftsmen, may be disadvantageous since the circulation of air round the tile is impeded. Defects invariably arise in torched roofs where the torching is pressed down too far between the tiles.

21. Size of Battens

Battens must not be less than 1 inch wide and ¾ inch thick.

22. Thickness of Counter-battens

Counter-battens must not be less than ½ inch thick.

23. Solid Bedding

Plain tiles must not be bedded solid.

24. (a) Quality of Felt

In all cases where felt is used and is not supported by boards, a reinforced bitumen felt or a bitumen felt supported on wire netting must be used. The bitumen must consist of natural or petroleum bitumen or a mixture of the two without the admixture of tars or pitches derived from coal or wood. The reinforcement of bitumen felt must consist of a suitable quality of woven hessian.

(b) Lap and Fittings

In all cases where felt is laid on boards, it must overlap at the horizontal joints by 3 inches and at vertical joints by 6 inches. In all cases where felt is not supported by boards, the overlap at horizontal joints must be 6 inches. In all cases the felt must be carried over the fascia board, and must be so fixed that no troughs into which water can be trapped are formed.

Definition of Terms used in the Code

Abutments—Parts of a structure rising above the roof, against which tiling is finished.

Battens—Small horizontal timber members to which tiles are nailed : sometimes termed tiling-battens or tiling-laths.

Bedding—Laying tiles in mortar.

Counter-battens—Small timber members laid up the slope of a roof to raise the battens and tiling clear of roof boarding or felt.

Eaves—Horizontal edges of an inclined roof.

Fascia board—A timber member fixed to rafter ends, wall plate or wall face immediately below the eaves to provide support for rain water gutters.

Hip—The salient angle formed by the intersection of two inclined roof surfaces.

Lap—The amount by which one course of tiles covers the course next but one below it.

Mansard—A roof built at two pitches, the steeper pitch commencing at the eaves and the flatter pitch finishing at the ridge. Sometimes used with reference to a steeply-pitched roof finishing at the edge of a flat roof.

Pitch—Angle of inclination of a roof surface with the horizontal.

Ridge—The horizontal intersection of two inclined roof surfaces.

Soakers—Flexible members, usually of metal, bonded with the tiles and bent to form a water-tight joint, as, for example, at an abutment where they are used in conjunction with flashings, or at mitred hips, valleys and angles.

Sprocketed Eaves—Eaves formed at a less pitch than the remainder of the roof by the provision of short false rafters—sprockets.

Step Flashing—Flexible material, usually metal, built into an abutment to make a water-tight joint with the soakers.

Tile Fillet—Tiles cut and fitted to form a fillet between an abutment and a roof surface, as an alternative to flashings.

Torching—Mortar pointing to the internal joints and/or heads of tiling.

Valley—The re-entrant angle formed by the intersection of two inclined roof surfaces.

Verges—The edges of a roof surface finishing at a gable, or the edges of vertical tiling at window reveals, ends of walls and dormer cheeks.

Tables of Angles

For Hip and Valley Tiles

By kind permission of Messrs. Wheatly & Co. Ltd.
of Springfield Tileries, Trent Vale, Stoke-on-Trent,
the owners of the copyright of Jackson's Tables.

In view of the practical application of these Tables, it is anticipated that they will create a standard which should be useful and helpful to Tilers and Slaters and all who are interested in roofing.

It will be observed that there is a relationship of degrees between the Angles, and a comparison of one angle with another will prove the accuracy of the tables.

The figures in columns 1, 2, 3 and 4 represent degrees.

Hip Tiles for Equal Slopes

SQUARE ON PLAN

1	2	3	4
PITCH AT RIDGE OR APEX OF ROOF	INCLINATION TO THE HORIZONTAL	PITCH OF TIMBERS	ANGLE OF HIP TILE
degrees	degrees	degrees	degrees
15	82½	91	**94½**
20	80	92	**96**
25	77½	93	**97½**
30	75	94	**99**
35	72½	95	**101**
40	70	96½	**103**
45	67½	98½	**105½**
50	65	100½	**108**
55	62½	102½	**110½**
60	**60**	**104½**	**113**
65	57½	107	**115½**
70	55	109½	**118**
75	**52½**	**112**	**121**

Hip Tiles for Equal Slopes—*Continued*

SQUARE ON PLAN

1	2	3	4
PITCH AT RIDGE OR APEX OF ROOF	INCLINATION TO THE HORIZONTAL	PITCH OF TIMBERS	ANGLE OF HIP TILE
degrees	degrees	degrees	degrees
80	50	114½	**124**
85	47½	117	**127**
90	**45**	**120**	**130**
95	42½	123	**133**
100	40	126	**136**
105	**37½**	**129**	**139½**
110	35	132	**143**
113	**33½**	**134**	**145**
115	32½	135½	**146½**
120	**30**	**138½**	**150**
125	27½	141½	**153**
130	25	145	**156½**
135	22½	148½	**160**
140	20	152	**163½**
145	17½	155½	**167**
150	15	159	**170½**
155	12½	162½	**174**
160	10	166	**177½**
163½	8¼	168½	**180**

The difference in the figures between columns 3 and 4 is caused by the tilt of the tiles. The contained angle of Hip Tiles is flatter than the angle of the timbers.

Architects describe pitches from the horizontal, as shown in column 2.

Angle of Valley Tiles 5 degrees flatter than Hip Tiles.

Hip Tiles for Unequal Slopes

SQUARE ON PLAN

1	2	3	4
PITCH AT RIDGE OR APEX OF ROOF	INCLINATION TO THE HORIZONTAL	PITCH OF TIMBERS	ANGLE OF HIP TILE
degrees	degrees	degrees	degrees
60 & 75	60 & 52½	108	**117**
60 & 90	60 & 45	111	**122**
75 & 90	52½ & 45	116	**126**
75 & 105	52½ & 37½	119	**131**
75 & 110	52½ & 35	120	**132**
75 & 113	52½ & 33½	120½	**133**
75 & 115	52½ & 32½	121	**134**
90 & 105	45 & 37½	124	**135½**
90 & 110	45 & 35	125	**137**
90 & 113	45 & 33½	126	**138**
90 & 115	45 & 32½	127	**139**
105 & 113	37½ & 33½	131½	**142½**
105 & 115	37½ & 32½	132½	**143½**
113 & 120	33½ & 30	136½	**147½**

N.B.—When tiling roofs of unequal slopes, the flatter of the two slopes should be tiled first.

Angle of Valley Tile 5 degrees flatter than Hip Tiles.

Octagon Hip Tiles for Equal Sides

OCTAGONAL ON PLAN

1	2	3	4
PITCH AT RIDGE OR APEX OF ROOF	INCLINATION TO THE HORIZONTAL	PITCH OF TIMBERS	ANGLE OF HIP TILE
degrees	degrees	degrees	degrees
10	85	135¼	**137**
15	82½	135½	**137½**
20	80	135¾	**138**
25	77½	136¼	**138½**
30	75	136½	**139**
35	72½	137	**140**
40	70	138	**140½**
45	67½	138½	**141½**
50	65	139½	**142½**
55	62½	140½	**143½**
60	60	141½	**145**
65	57½	142½	**146½**
70	55	144	**147½**
75	52½	145	**149**
80	50	146	**150½**
85	47½	147½	**152**
90	45	149	**153½**
95	42½	150½	**155**
100	40	152	**156½**
105	37½	153	**158½**
110	35	154½	**160**
113	33½	155½	**161**
115	32½	156½	**162**
120	30	158	**164**
125	27½	160	**165½**
130	25	161½	**167½**
135	22½	163	**169½**

Hexagon Hip Tiles

1	2	3
PITCH AT APEX	INCLINATION TO THE HORIZONTAL	ANGLE OF HIP TILE
degrees	degrees	degrees
60	60	**134**
75	52½	**139½**
90	45	**145**
105	37½	**152**
113	33½	**155**
120	30	**158½**

Angle Tiles

VERTICAL ANGLE TILES	degrees
Square on Plan	**91¼**
Hexagon on Plan	**120½**
Octagon on Plan	**135½**

Quantities

Number of ordinary Hip or Valley Tiles required per 100 feet run of Hip or Valley Rafter :—

PITCH OF ROOF	WHEN ORDINARY PLAIN TILES ARE FIXED AS FOLLOWS—		
degrees	2½ in. lap	3 in. lap	3½ in. lap
60	268	286	307 per 100 ft. run
75	258	276	295 ,, ,,
90	246	263	282 ,, ,,
105	235	251	269 ,, ,,
113	231	247	264 ,, ,,
120	227	243	260 ,, ,,

The Hip Rafter takes the same number of Tiles as the Common Rafter, but if the length of the Hip or Valley Rafter is measured the figures in this table should be used.

Miscellaneous

The covering capacity of Roofing Tiles is the area of the exposed surface when fixed. If fixed at a 4-in. gauge the exposed surface of every Tile would be 4-in. × 6½-in. (6½-in. being the width) = 26 square inches. 26 divided into the number of inches in a square yard, viz. : 1,296 = about 50 tiles per square yard.

GAUGE	LAP OR COVER	NO. OF TILES PER YARD	NO. OF TILES PER SQUARE OF 100 FEET
*4 in.	2½ in.	50	555
3¾ in.	3 in.	53	589
3½ in.	3½ in.	57	633

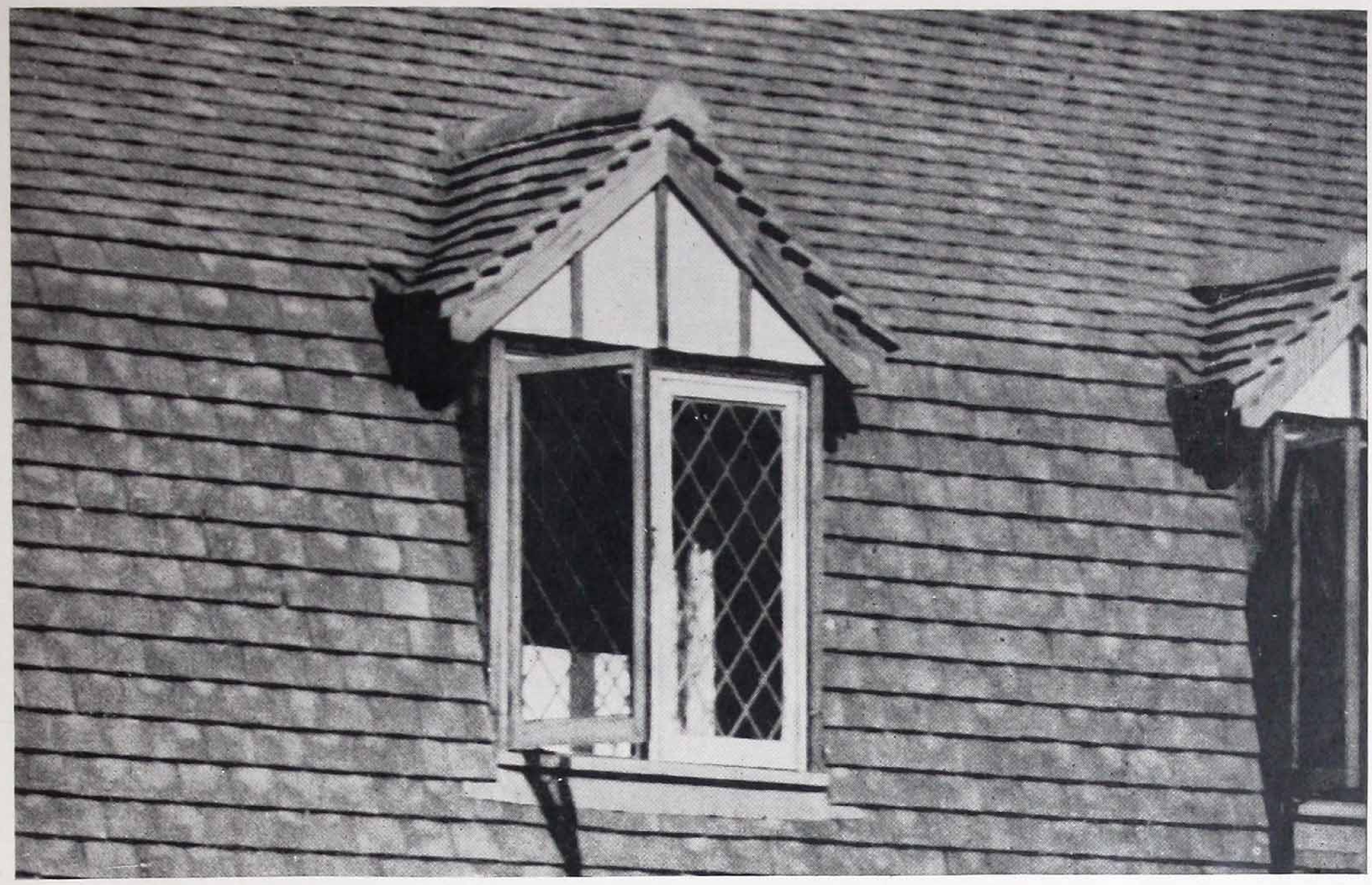
To obtain the gauge, deduct the lap from the length of the Tile and divide by 2.

To obtain the lap, deduct twice the gauge from the length of the Tile.

*For Tiles, a 4-in. gauge in almost universally adopted.

Eaves Tiles—5½ Tiles per lineal yard.

Tile and Half Tiles—These are used alternately and 1½ Tiles per foot run of Gable should be calculated. Usually about 40 Tile and Half Tiles to 1,000 of ordinary Plain Tiles are required.

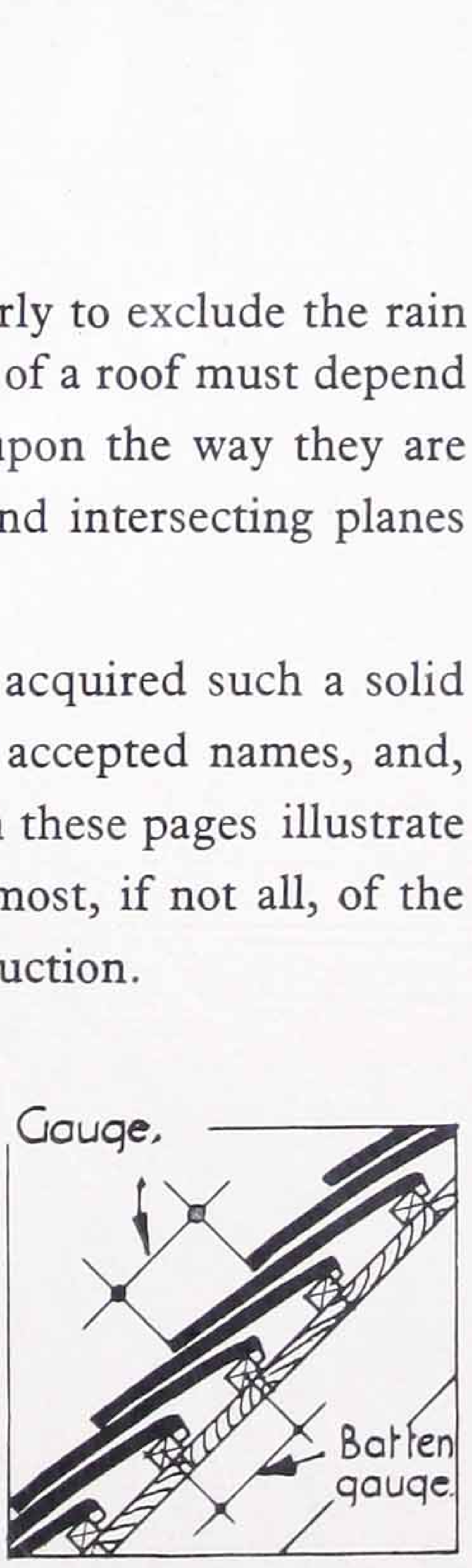


ROOF TILING

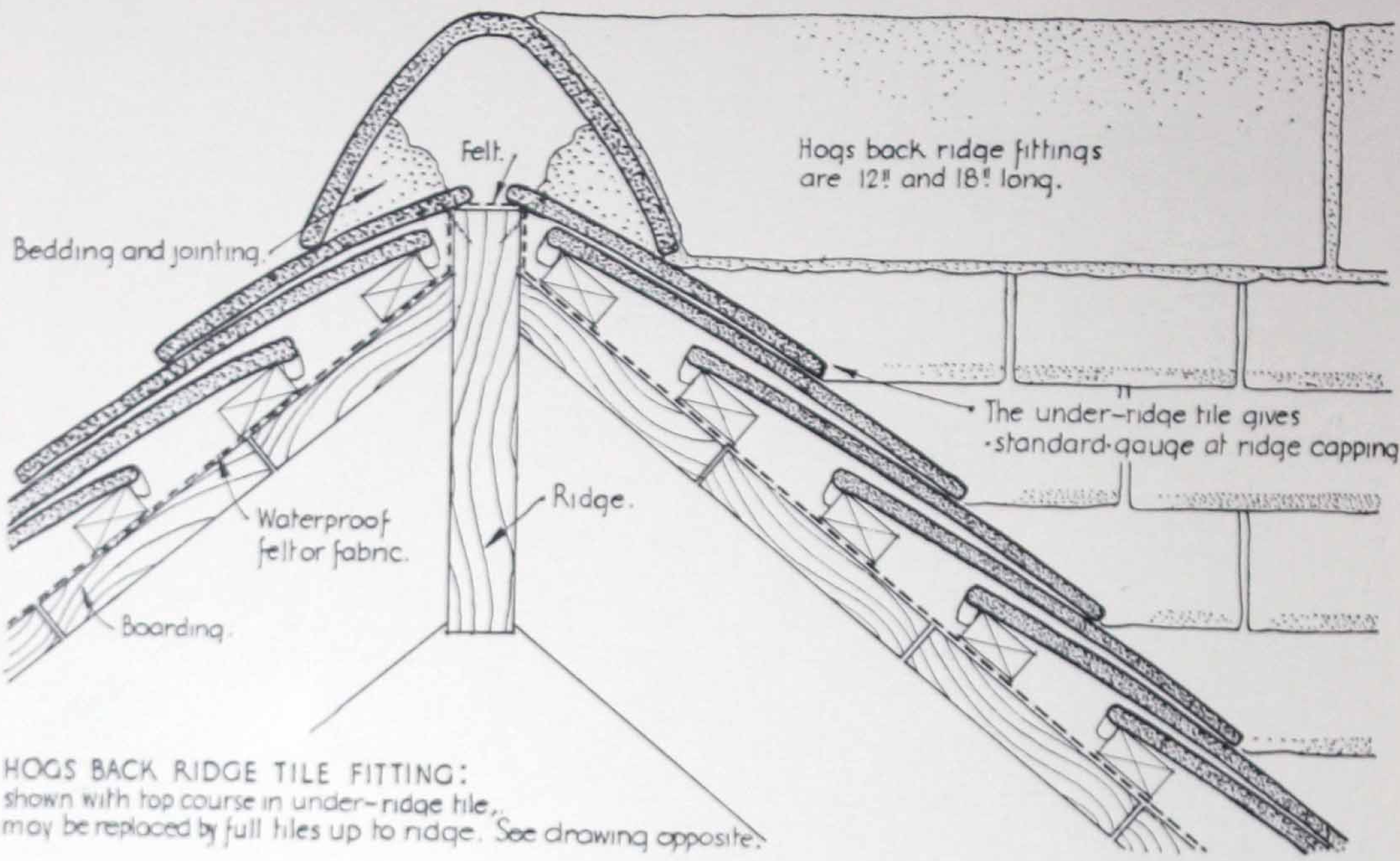
As the main function of any roof is to exclude the elements and particularly to exclude the rain and snow from the structure below, in pitched roofing work the efficiency of a roof must depend upon the normal tile used throughout the main areas of the roof, and upon the way they are laid, and also upon the methods used at the various angles, junctions and intersecting planes which occur in normal roofing work.

The practice of clay plain tile roofing is so old in this country and has acquired such a solid body of tradition that all the various parts of a roof have long acquired accepted names, and, in most cases, accepted methods of construction. The sketches given on these pages illustrate some of these accepted terms, but it should be borne in mind that for most, if not all, of the parts of a roof there are two, three or perhaps more methods of construction.

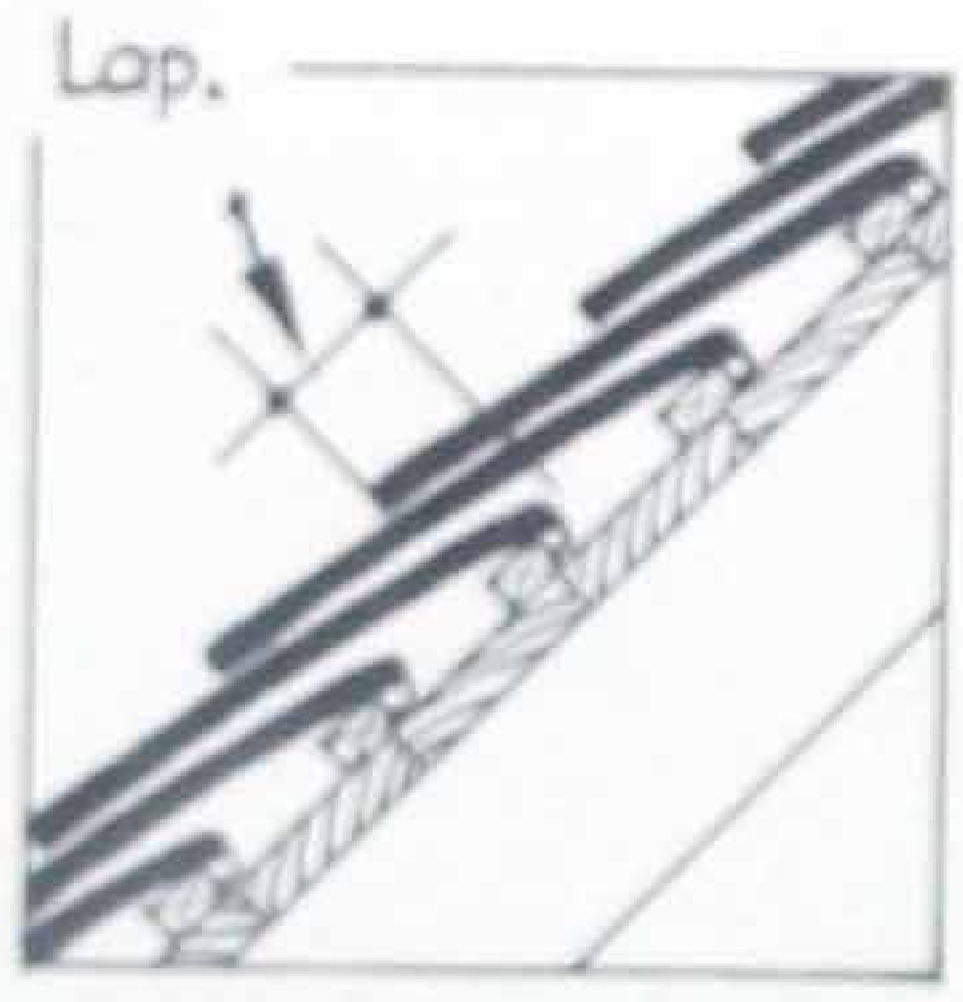
Gauge



The gauge of a plain tile is the amount (in inches) of the tile which is exposed after the course above has been laid. Gauge, therefore, equals the length of the tile minus the lap, divided by two. $\left(G = \frac{\text{Length - lap}}{2}\right)$ With a 10½-in. tile and a 2½-in. lap., the gauge is, therefore, 4 inches.

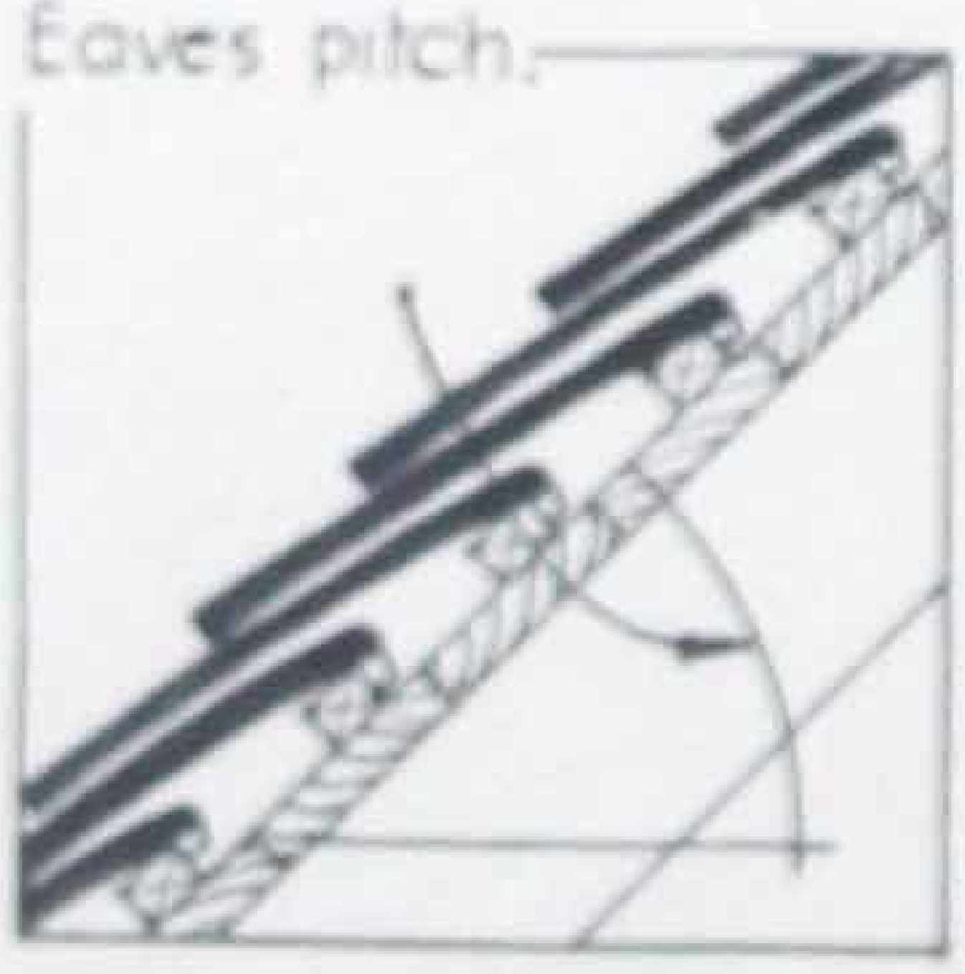

Felt.
Hogs back ridge fittings are 12" and 18" long.
Bedding and jointing.
The under-ridge tile gives standard gauge at ridge capping.
Ridge.
Waterproof felt or fabric.
Boarding.

HOGS BACK RIDGE TILE FITTING:
shown with top course in under-ridge tile,
may be replaced by full tiles up to ridge. See drawing opposite.



Lap

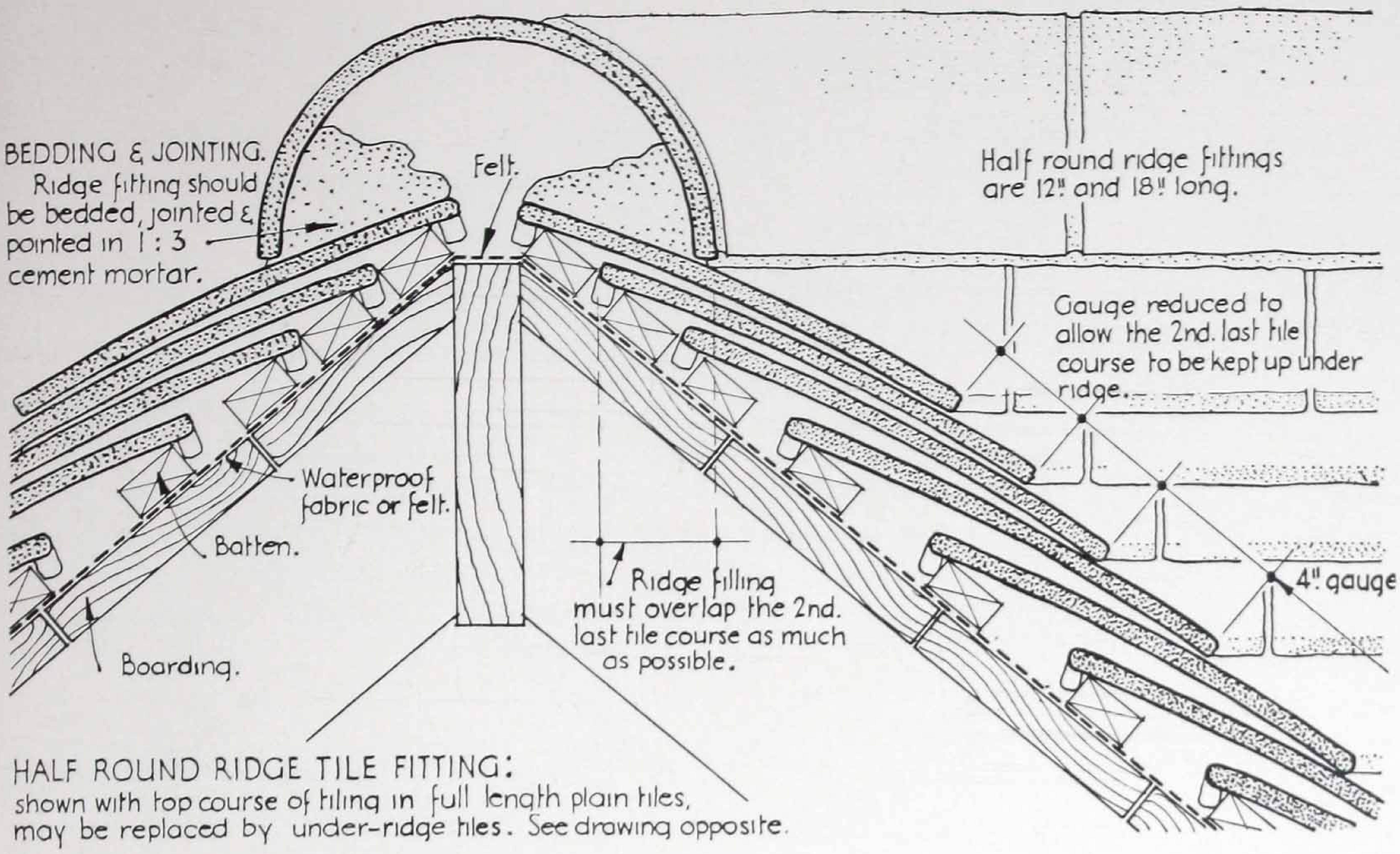
Lap is the amount one tile course overlaps the second course below it. Lap, therefore, equals length minus twice the gauge. The lap of normal pitched roofs with plain tiles should never be less than 2½-in. For low pitched roofs or very exposed positions the lap should be increased. For further details of this subject, reference should be made to " the recommendations as to the minimum pitch and lap to suit the type of exposure " given on Information Sheet No. 445, issued by the Clay Products Technical Bureau of Great Britain.



Pitch

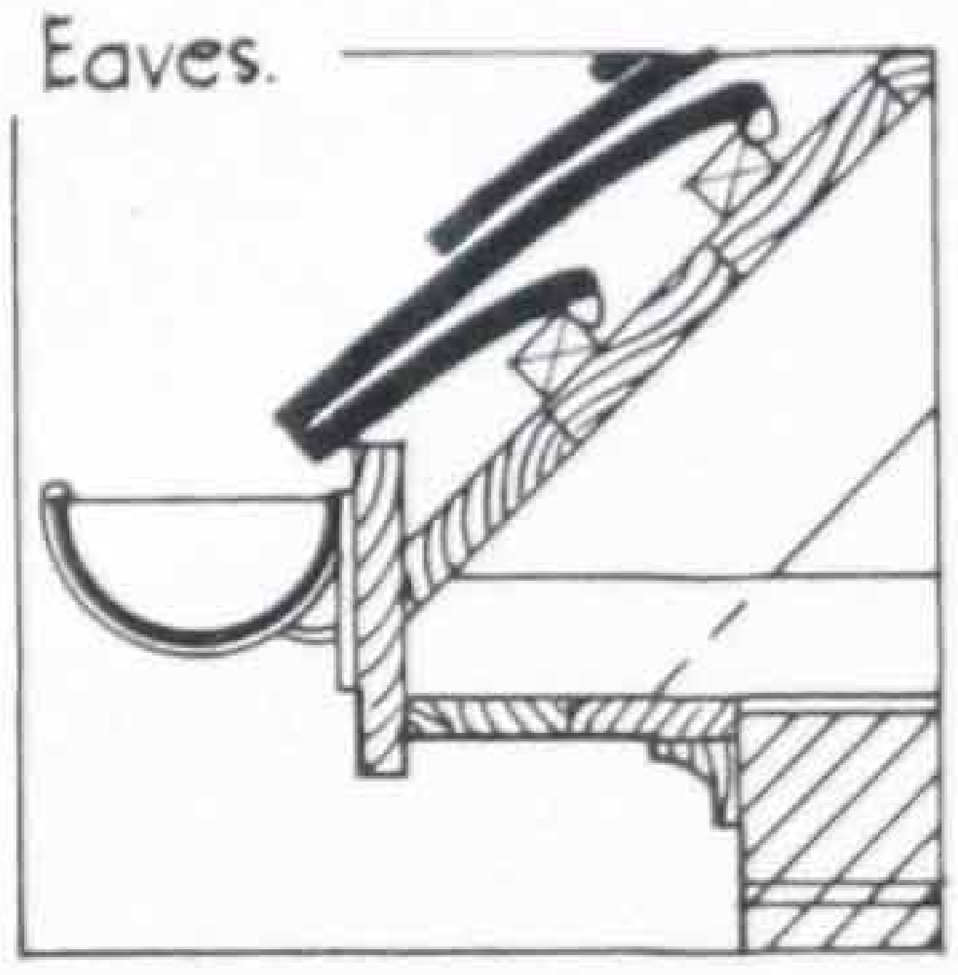
The pitch used is a vital factor in the efficient performance of a tiled roof, and it is frequently not realised that the pitch of the tile is always less than the pitch of the rafters owing to the effect of overlapping one course on another.

The minimum pitch to be used must always depend upon the type of construction on which the tiles are laid and the conditions or exposure of the site. A careful analysis has been given in the Information Sheet referred to above (No. 445), and reference should be made to the table given there. In general, it may be said that the minimum pitch which should be used for normal conditions is 40 degrees.


BEDDING & JOINTING.
Ridge fitting should be bedded, jointed & pointed in 1 : 3 cement mortar.
Felt.
Half round ridge fittings are 12" and 18" long.
Gauge reduced to allow the 2nd. last tile course to be kept up under ridge.
Waterproof fabric or felt.
Batten.
Boarding.
Ridge filling must overlap the 2nd. last tile course as much as possible.
4" gauge

HALF ROUND RIDGE TILE FITTING:
shown with top course of tiling in full length plain tiles, may be replaced by under-ridge tiles. See drawing opposite.

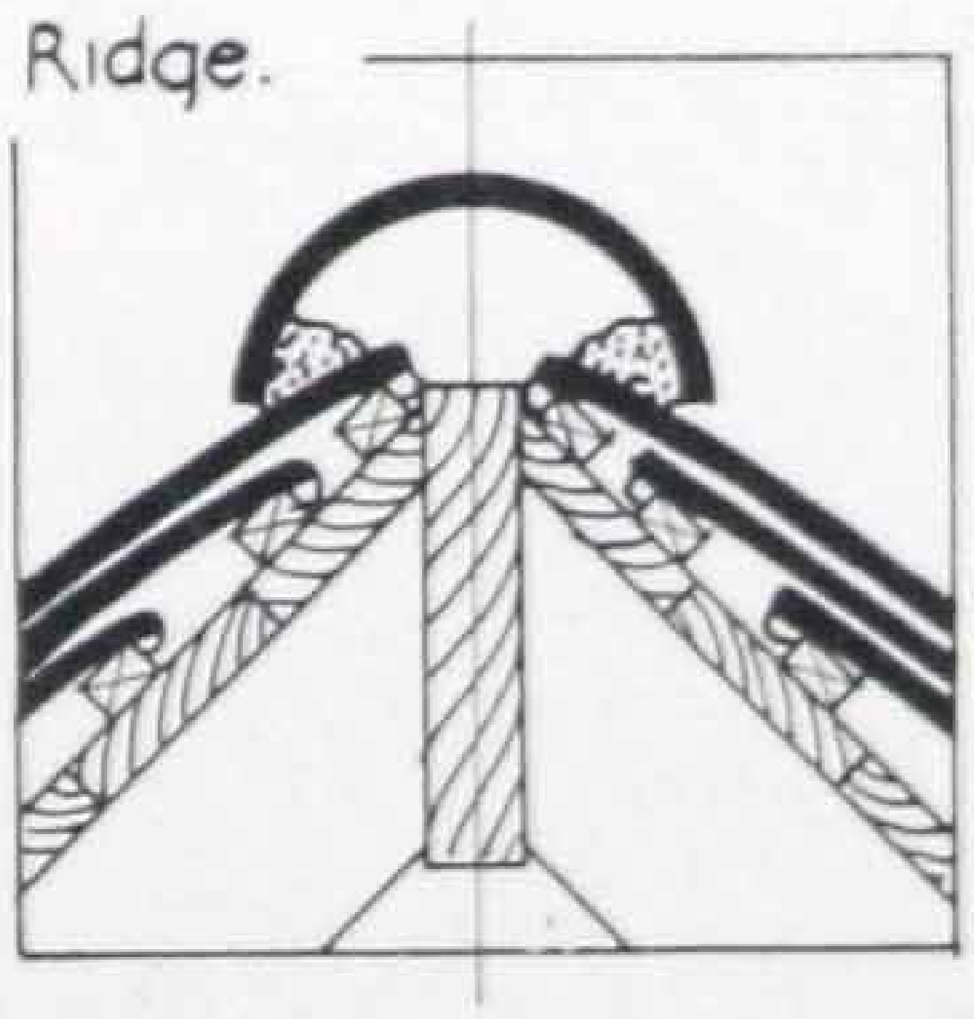
Eaves



The eaves may be defined as that portion of the tiled roof which overhangs the external wall at the foot of the slope.

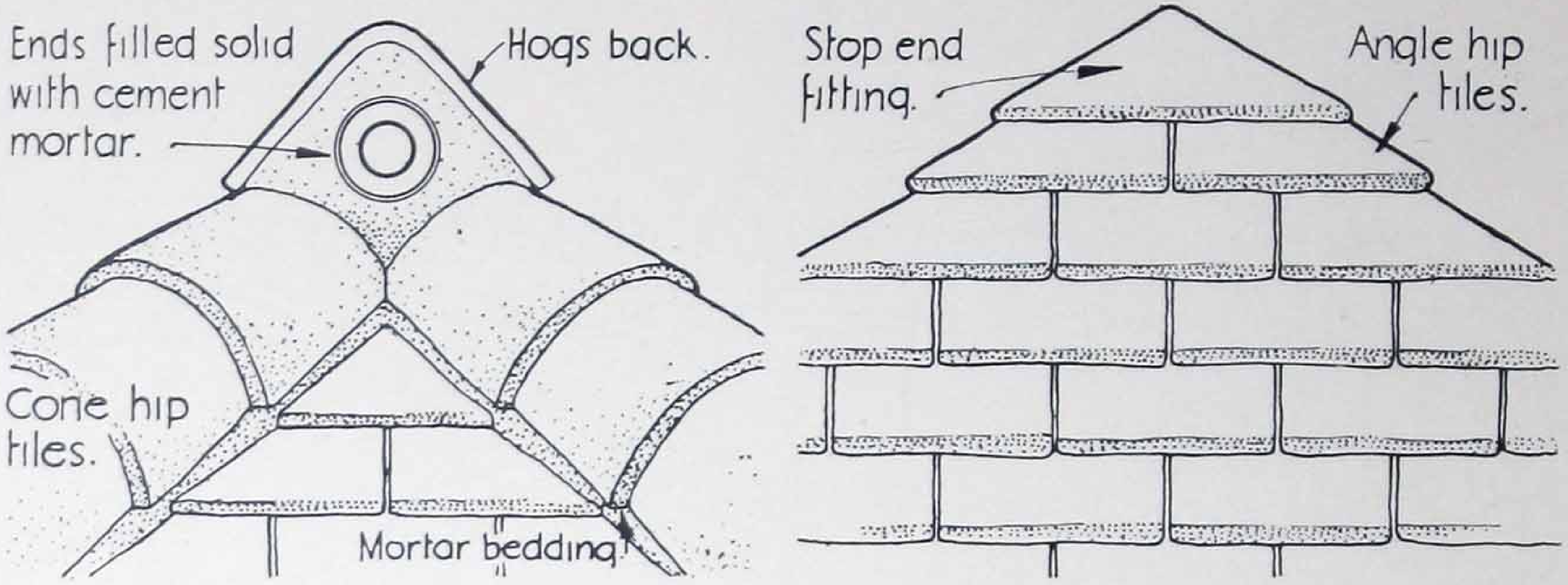
There are numerous methods of finishing the eaves of a roof, the commonest being some form of wood framing consisting of fascia and soffit boarding or battening; other interesting forms, consisting of plain or shaped tiles bedded in mortar on the top of the wall, are illustrated on pages 54, 55, 56 and 57.

Ridge

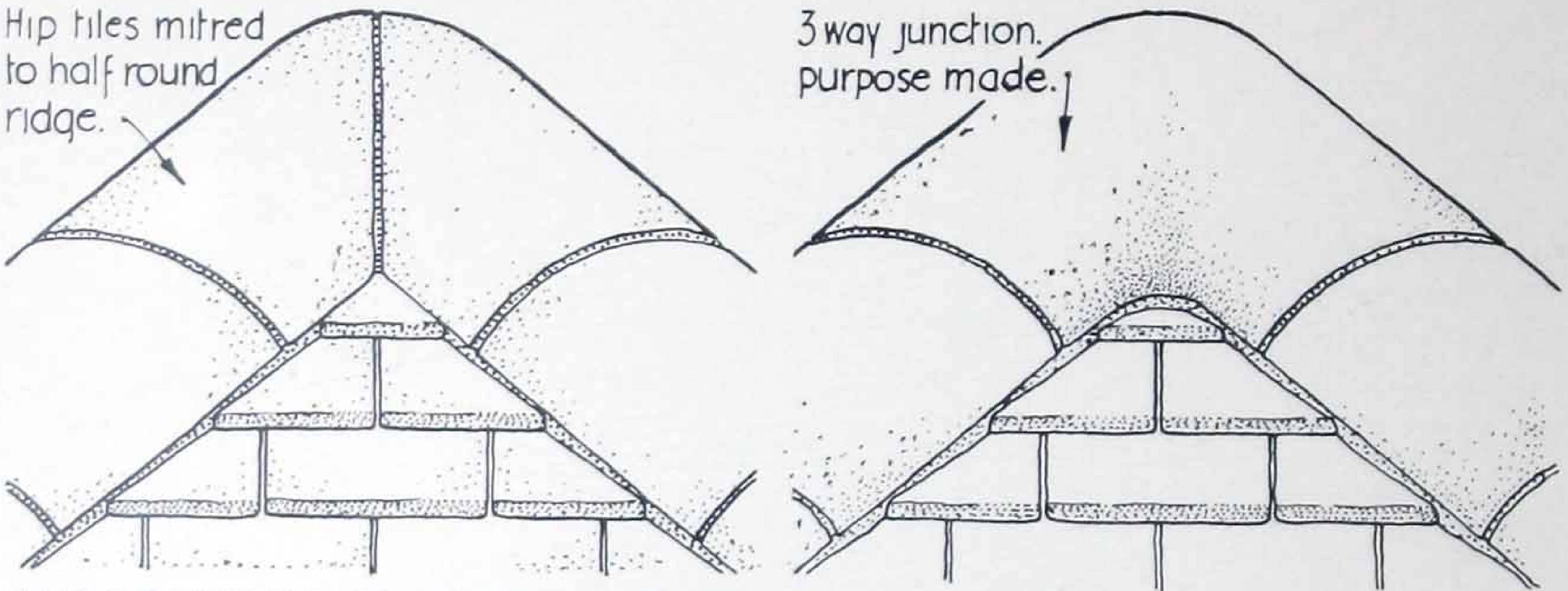


The ridge is the horizontal junction formed by the intersection of two pitched roofs at their apex. A large number of specially shaped ridge tiles are available for covering this apex as, for instance, the hog back ridge, the half-round ridge—plain or capped, and the angular section ridge—plain or capped. Ridges are sometimes bedded solid in mortar throughout their length, but this practice is not to be recommended. Bedding should be confined to the two lower edges on either side, as shown on the two detailed sketches above.

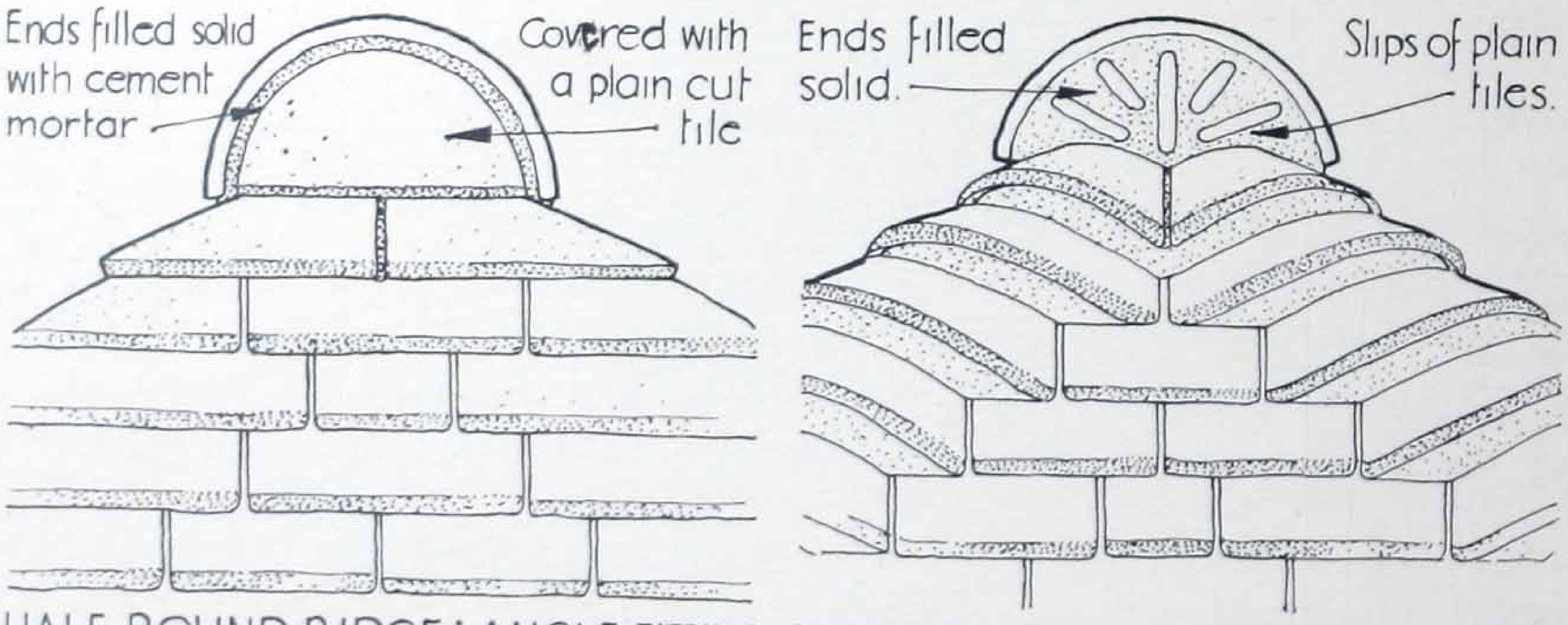
VARIOUS TYPES OF STOPPED ENDS USED IN PITCHED TILE ROOFS:



HOGS BACK RIDGE & CONE HIPS: ANGLE RIDGE WITH STOP END: ANGLE HIPS.


Hip tiles mitred to half round ridge.
3 way junction. purpose made.

HALF ROUND RIDGE: AND HIP TILES. HALF ROUND RIDGE: WITH 3 WAY JUNCTION.

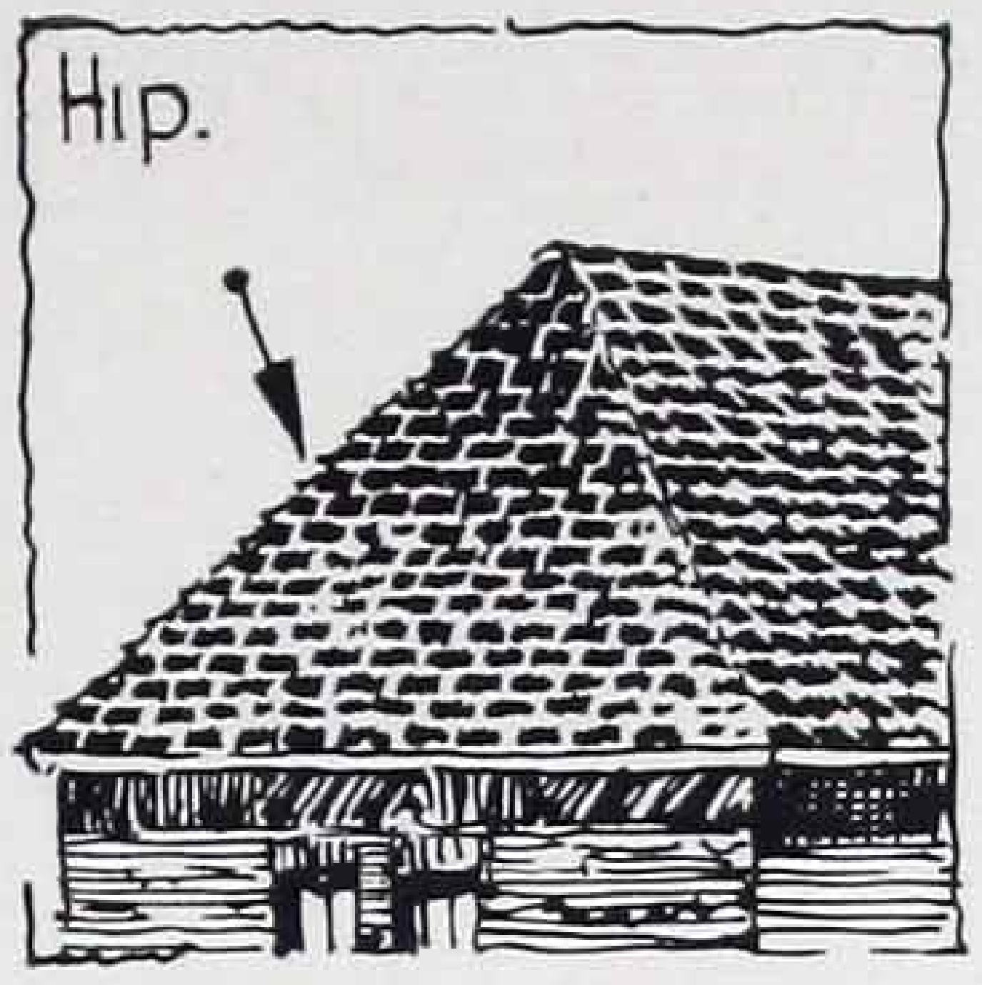

Ends filled solid with cement mortar
Covered with a plain cut tile
Ends filled solid.
Slips of plain tiles.

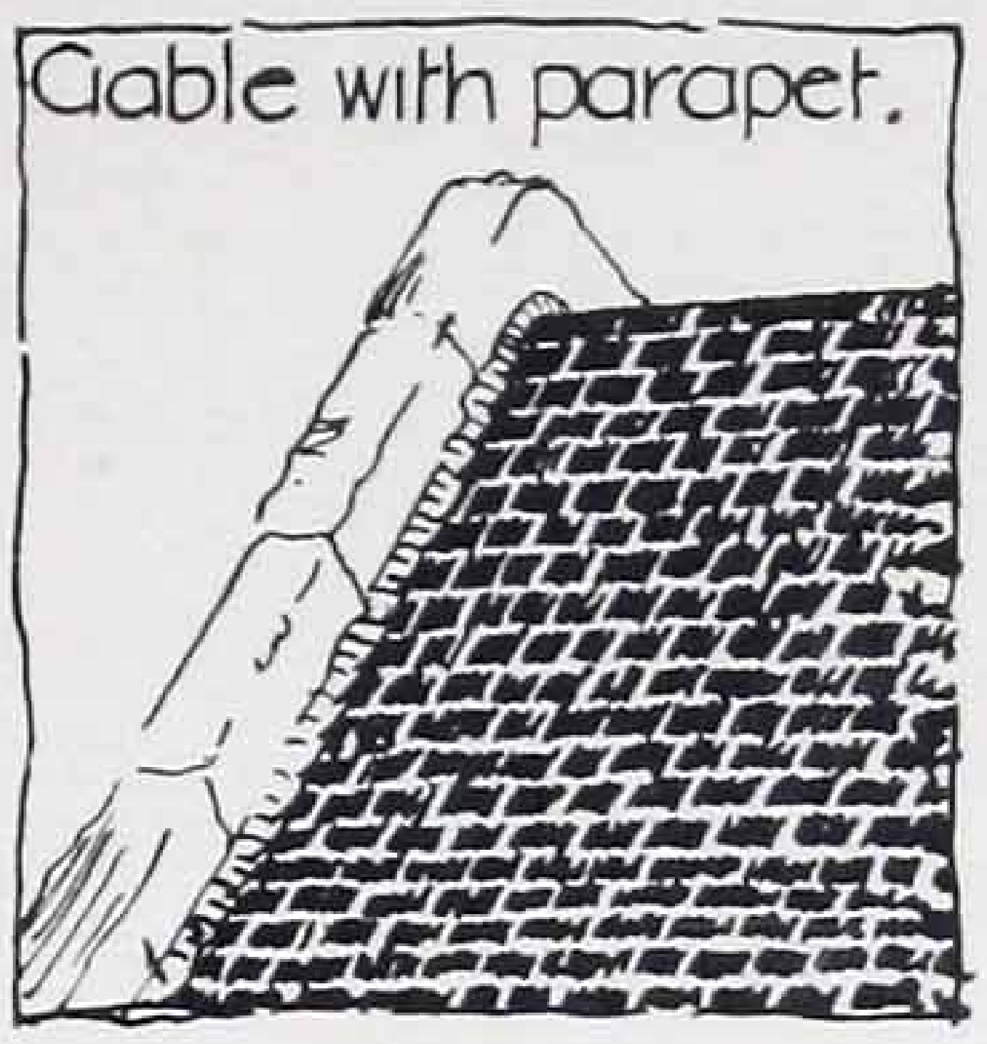
HALF ROUND RIDGE: ANGLE FITTING. HALF ROUND RIDGE: BONNET HIPS:

Valley

The valley which receives further consideration on pages 46, 47, 48, 49 is the internal angle formed by two pitched roofs intersecting, and, here again, there are numerous methods of constructing this detail. They may be formed by means of angular shaped or curved valley tiles to match the tiling used on the roof, or, in the case of plain tiling, by lacing or fashioning plain tiles to form laced or swept valleys.

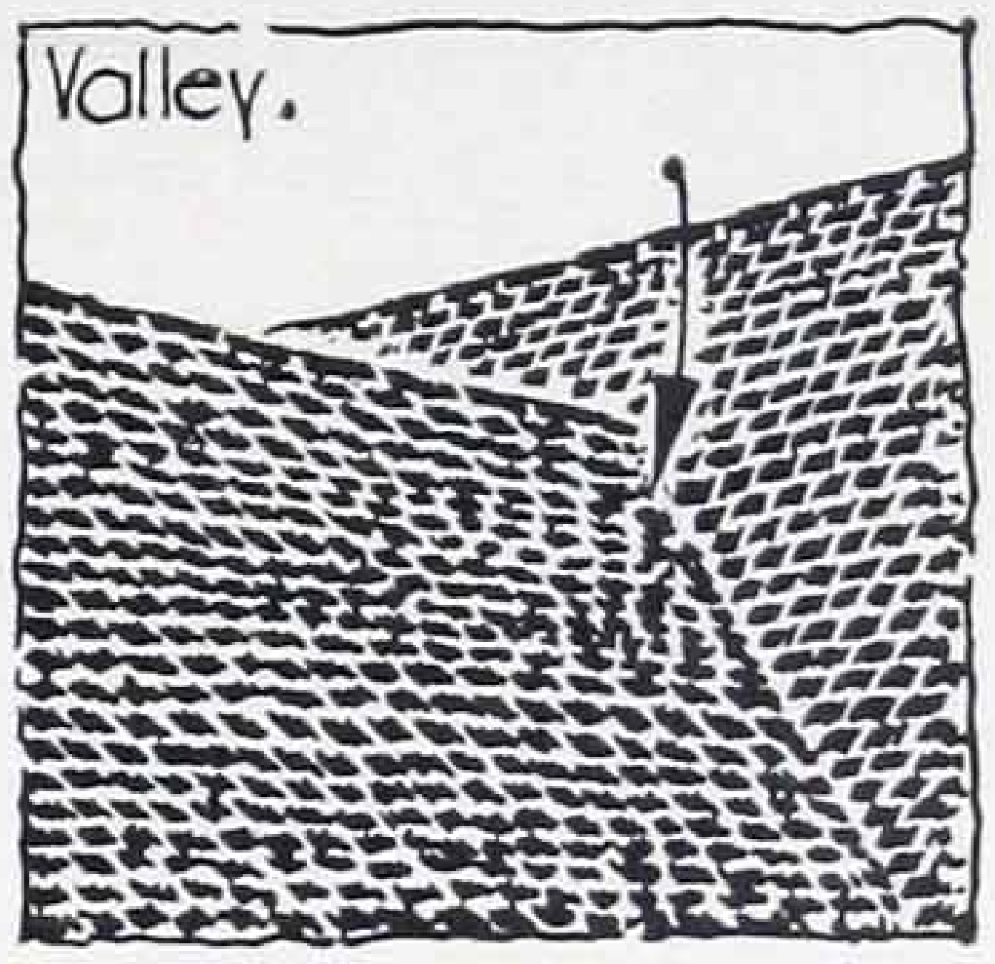
Other alternative methods of valley construction include the mitred valley, which, however, involves the use of lead soakers under every course and open valleys in lead, which although effective, are æsthetically unsatisfactory.




Gable with parapet.

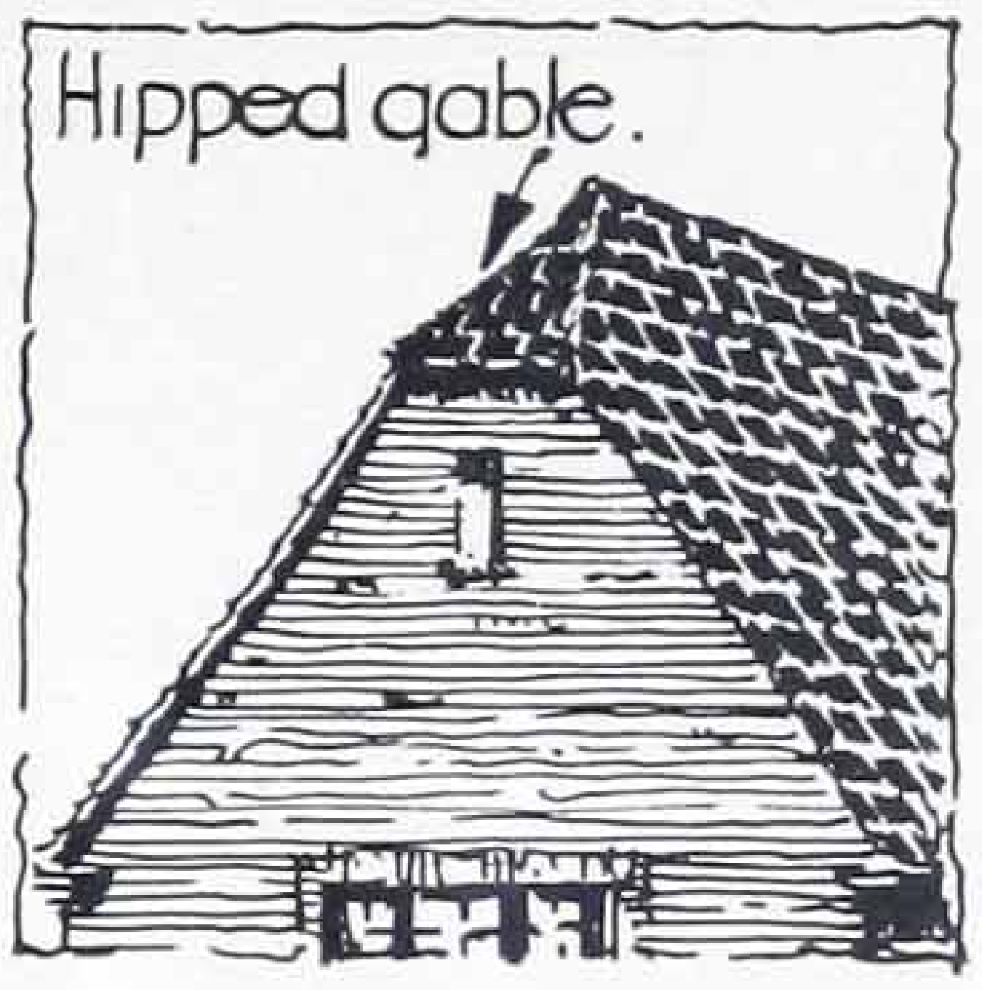
Hip

A hip is the external angle formed by the intersection of two roofs. Various specially shaped tiles are made varying from the close-fitting hip of angular section to the broadly curved types of bonnet hip and cone hip. Close mitred hips with lead soakers may also be used, although they are not common nowadays.



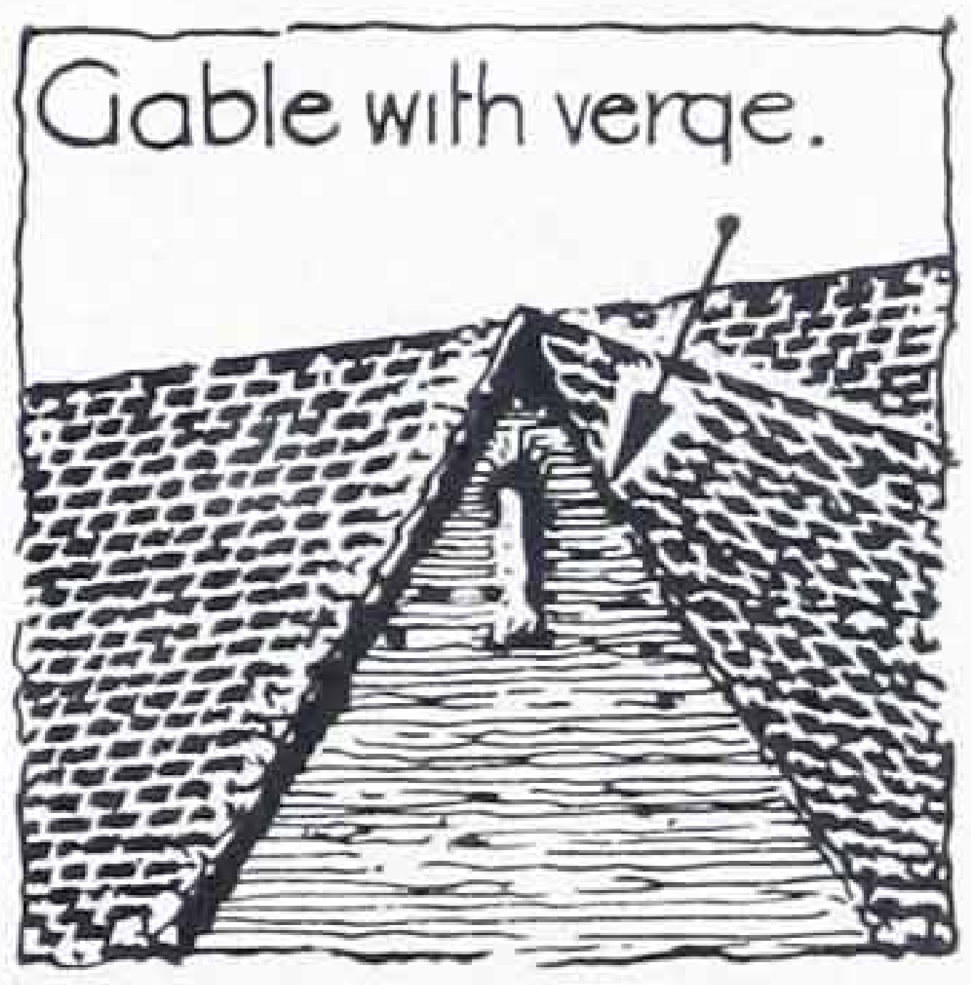
Gable and Verge

A gable is that portion of an external wall which extends upwards from eaves level to ridge level to intersect with the slopes of a pitched roof. The intersection of the roof with the gable is termed the verge.


Hipped gable.

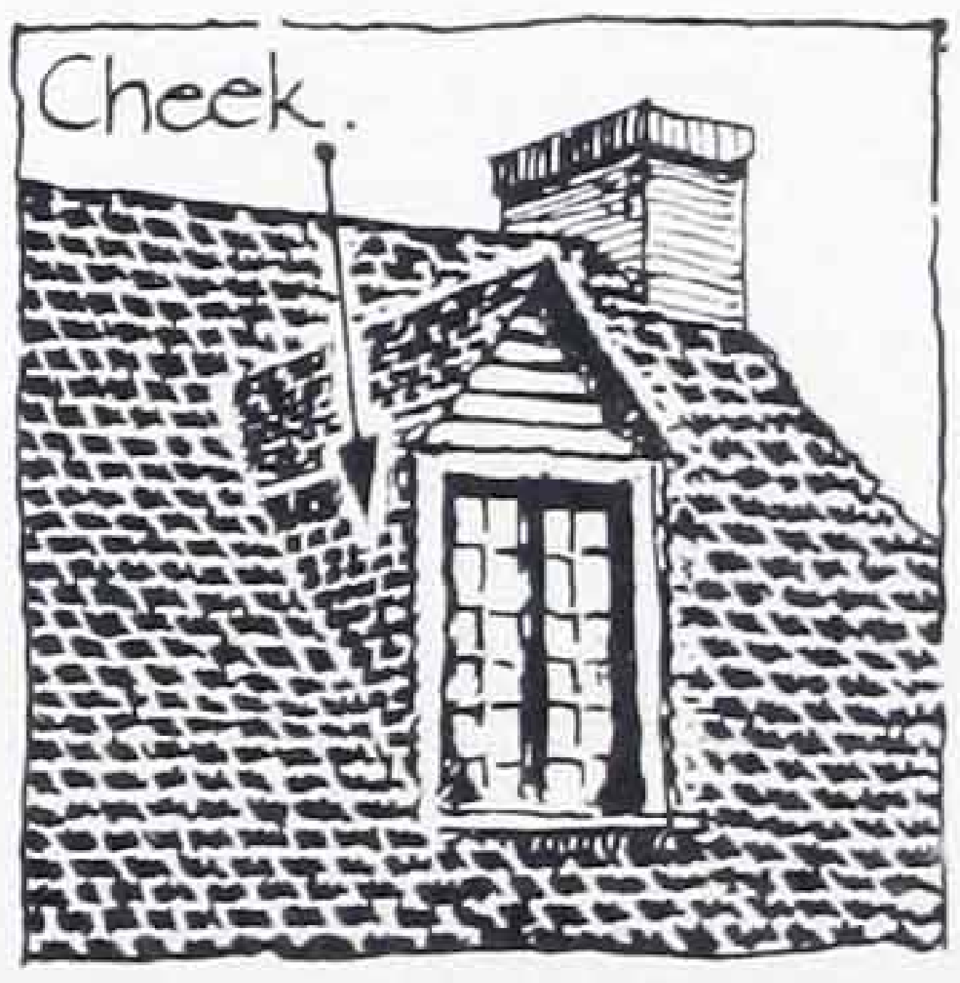
Hipped Gable

A hipped gable is a gable which has been stopped below the level of the ridge, the remaining portion above being roofed with tiles, and, therefore, necessitating hips.


Gable with verge.

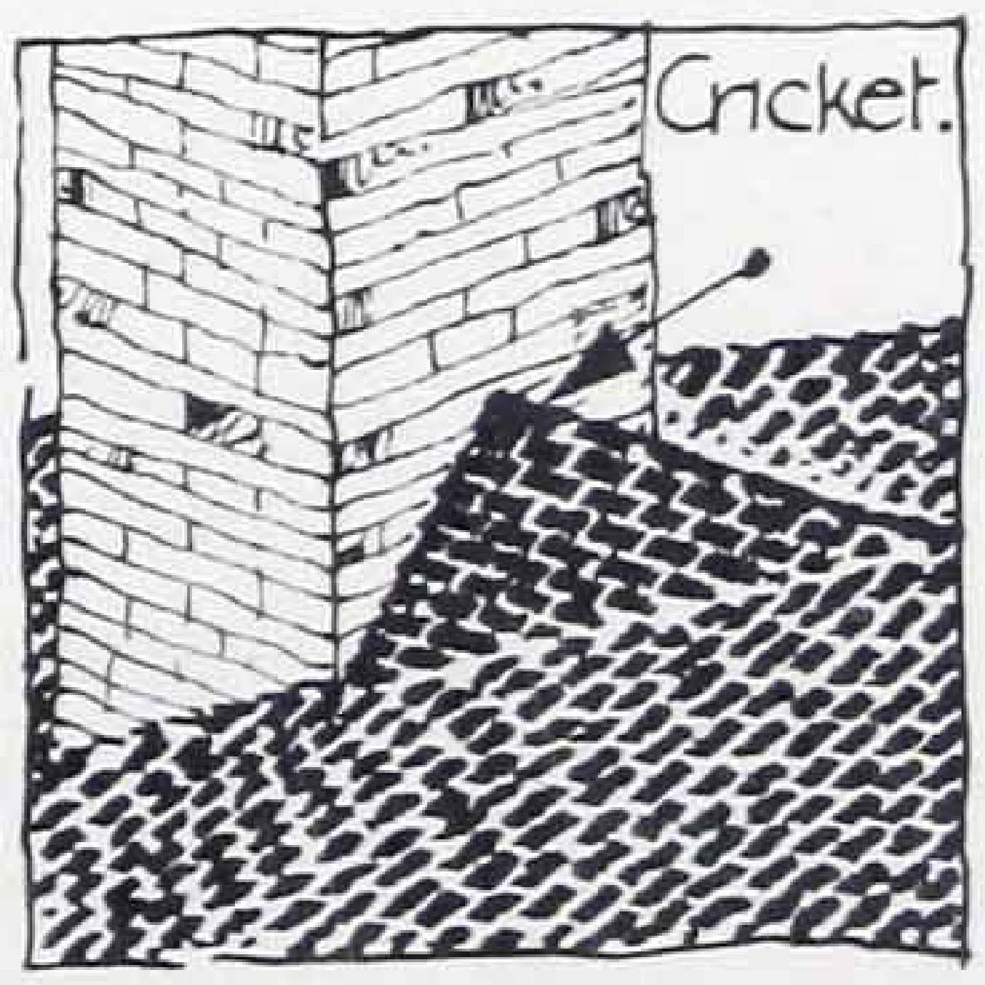
Cricket

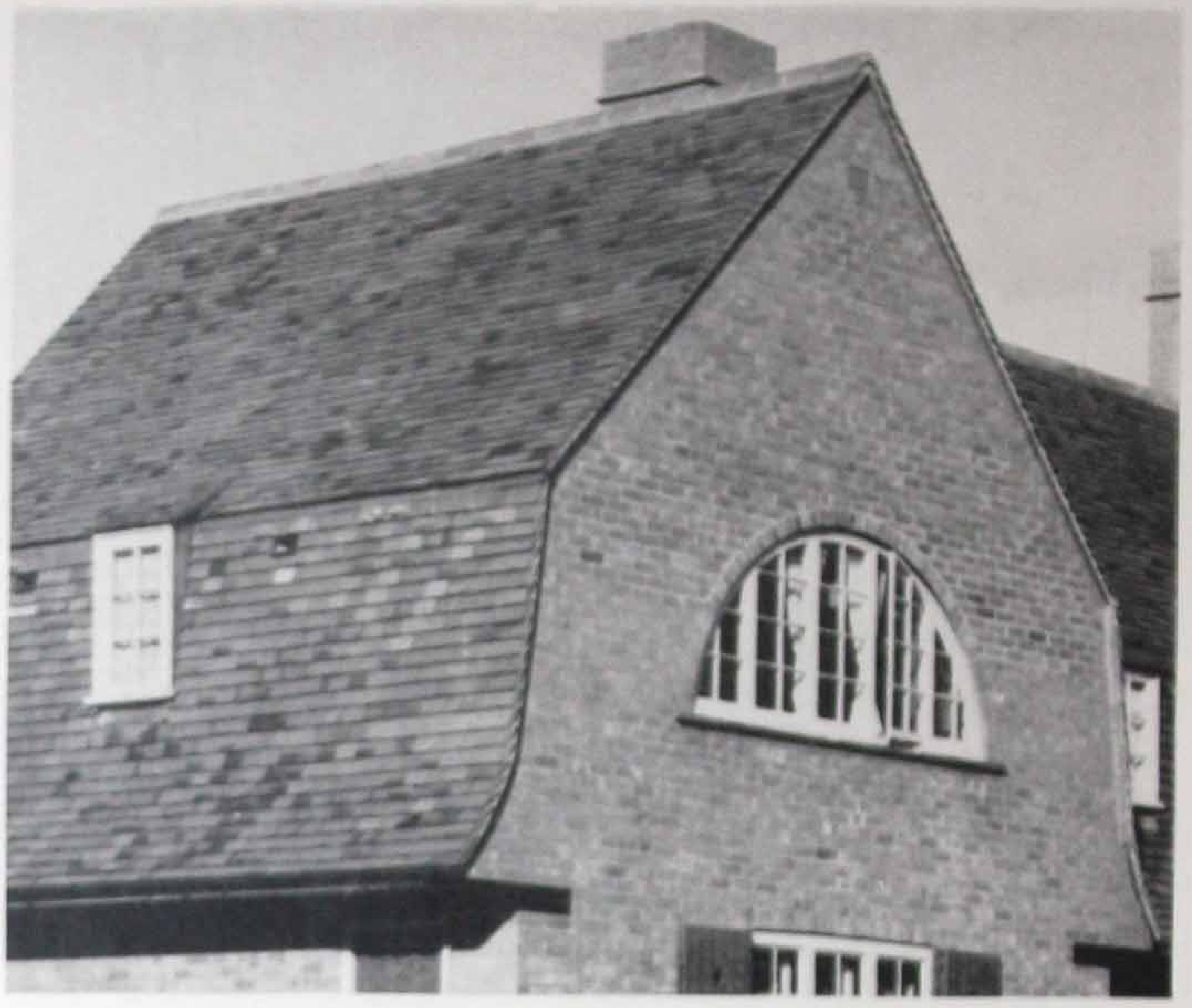
A cricket is a small pitched roof formed between the main roof and the back of a chimney stack. The cricket probably forms the best finish between the roof and the chimney since it avoids the necessity for a back gutter in this position which is always liable to become blocked with debris and hence cause flooding.



Dormer Cheek

The cheek is that triangular side wall which is formed by a dormer projecting from a pitched roof. When appearance is relatively unimportant such cheeks are covered with lead or some other waterproof material, but a better finish and appearance is obtained by tile hanging the cheek in the same tile as the roof itself.





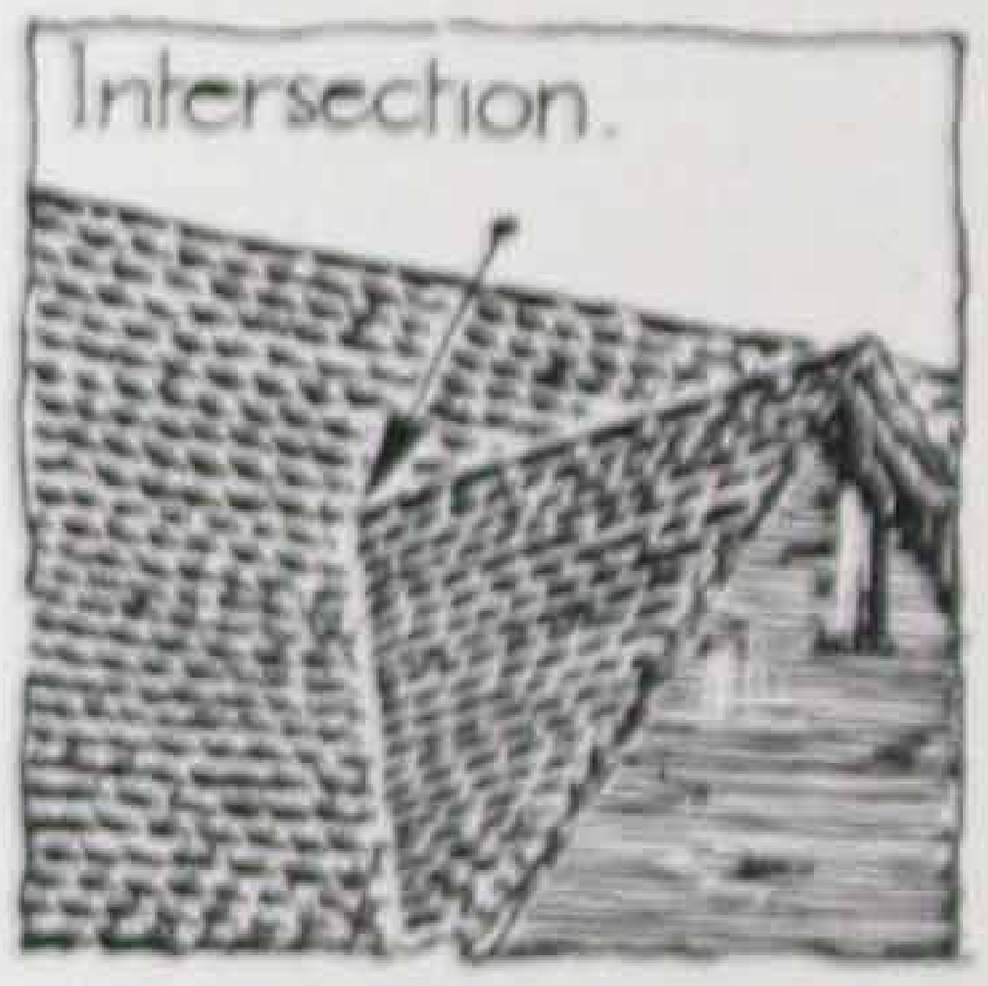
Mansard Roof

Mansard roof.

A mansard roof is one formed with two different pitches on either side of the ridge. That portion of the roof which springs from the wall plate being the steeper, this form of construction gives greater head room inside the roof and is commonly used to obtain extra space inside the building economically.

Intersection

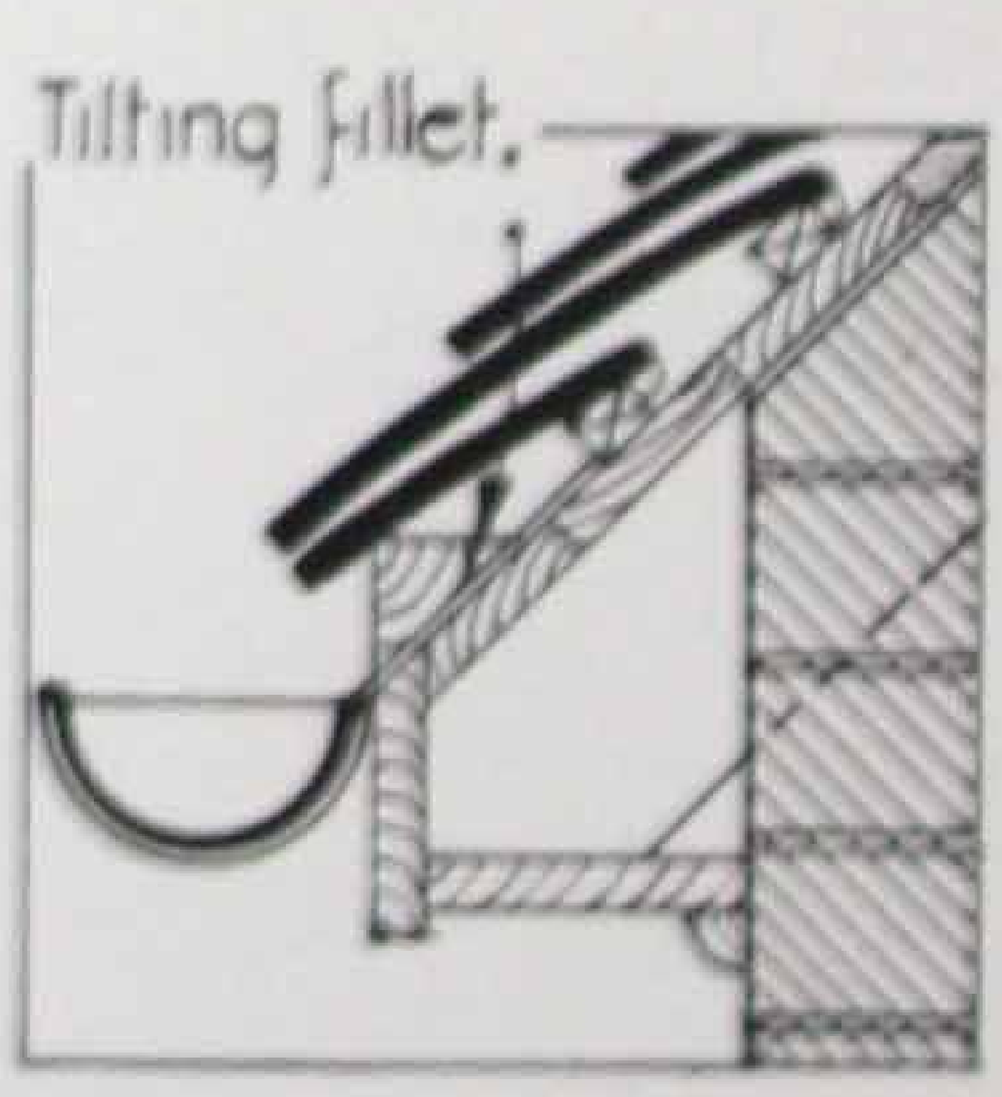
The term intersection is used here to describe the truncated junction between the ridge of a low subsidiary roof and the slope of the main roof.

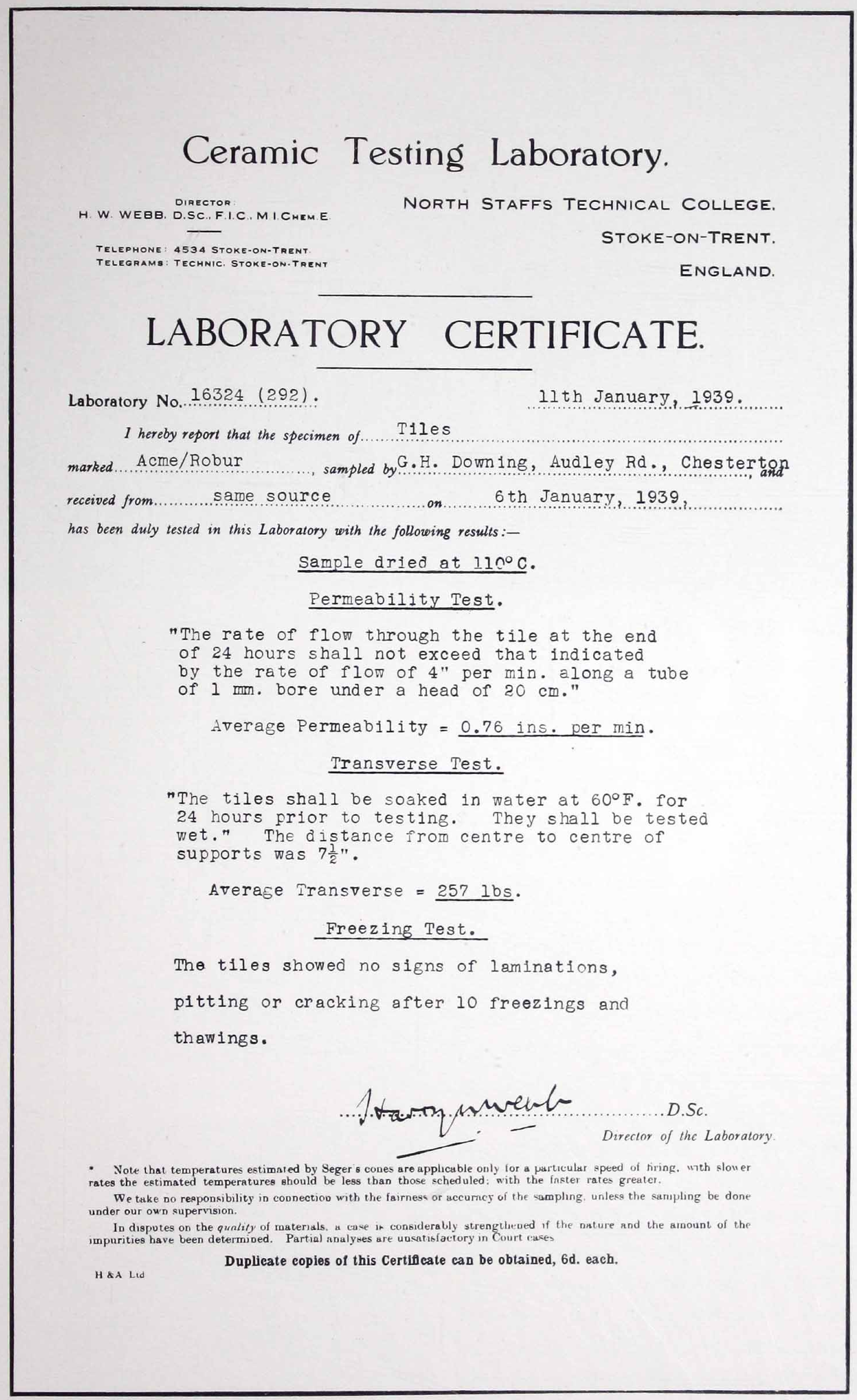


Tilting Fillet

A tilting fillet is a bevelled batten used at the eaves of a pitched roof to maintain the slope of the tiling in the last course of tiles. Tilting fillets or boards are also used to ease the change in direction in swept and laced valleys. In the case of eaves with a fascia board, the top edge of the board is often used to serve the purpose of a tilting fillet.

In the notes given in these pages the main parts of a normal roof have been briefly described and defined, but it will be realised that there are numerous variations in tiling practice and technique which may be used in the execution of any of these details. On page 42, for instance, are given some of the alternative methods available for finishing off the end of a ridge. Such details as these depend upon the various fittings made to work with roofing tiles, and upon the craftsmanship of the tile layers. The long tradition which lies behind English tile making and roofing practice has, however, given us not only the finest quality clay tiles but a great body of knowledge and experience in the tile laying trade which is of the greatest possible value to owners, builders and architects alike.





Ceramic Testing Laboratory.

DIRECTOR:
H. W. WEBB, D.SC., F.I.C., M.I.CHEM.E.

TELEPHONE: 4534 STOKE-ON-TRENT.
TELEGRAMS: TECHNIC, STOKE-ON-TRENT.

NORTH STAFFS TECHNICAL COLLEGE.
STOKE-ON-TRENT.
ENGLAND.

LABORATORY CERTIFICATE.

Laboratory No. 16324 (292). 11th January, 1939.

I hereby report that the specimen of Tiles

marked Acme/Robur, *sampled by* G.H. Downing, Audley Rd., Chesterton, *and*

received from same source *on* 6th January, 1939,

has been duly tested in this Laboratory with the following results:—

Sample dried at 110° C.

Permeability Test.

"The rate of flow through the tile at the end of 24 hours shall not exceed that indicated by the rate of flow of 4" per min. along a tube of 1 mm. bore under a head of 20 cm."

Average Permeability = 0.76 ins. per min.

Transverse Test.

"The tiles shall be soaked in water at 60°F. for 24 hours prior to testing. They shall be tested wet." The distance from centre to centre of supports was 7½".

Average Transverse = 257 lbs.

Freezing Test.

The tiles showed no signs of laminations, pitting or cracking after 10 freezings and thawings.

.... *D.Sc.*
Director of the Laboratory.

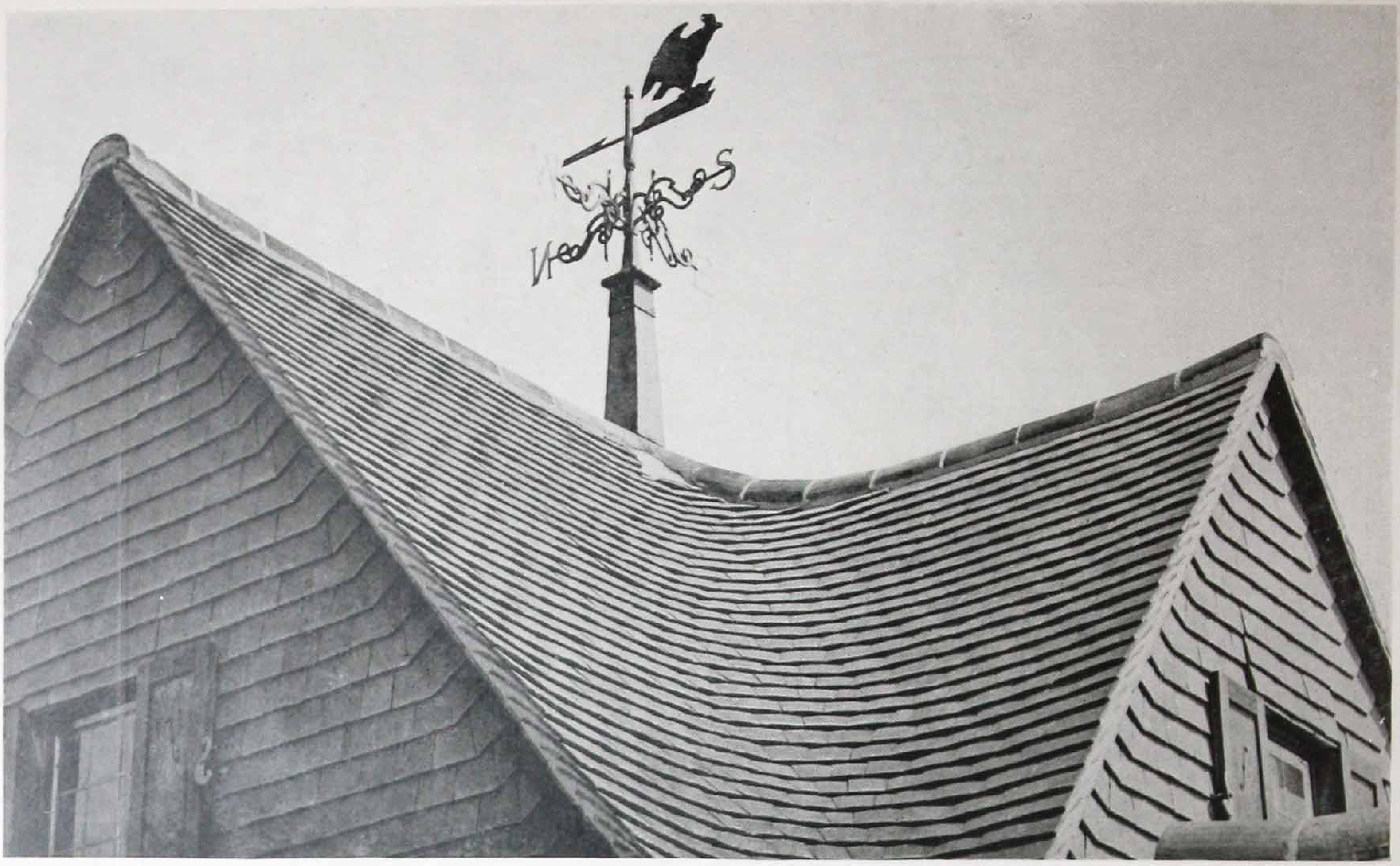
* Note that temperatures estimated by Seger's cones are applicable only for a particular speed of firing, with slower rates the estimated temperatures should be less than those scheduled; with the faster rates greater.

We take no responsibility in connection with the fairness or accuracy of the sampling, unless the sampling be done under our own supervision.

In disputes on the *quality* of materials, a case is considerably strengthened if the nature and the amount of the impurities have been determined. Partial analyses are unsatisfactory in Court cases.

Duplicate copies of this Certificate can be obtained, 6d. each.

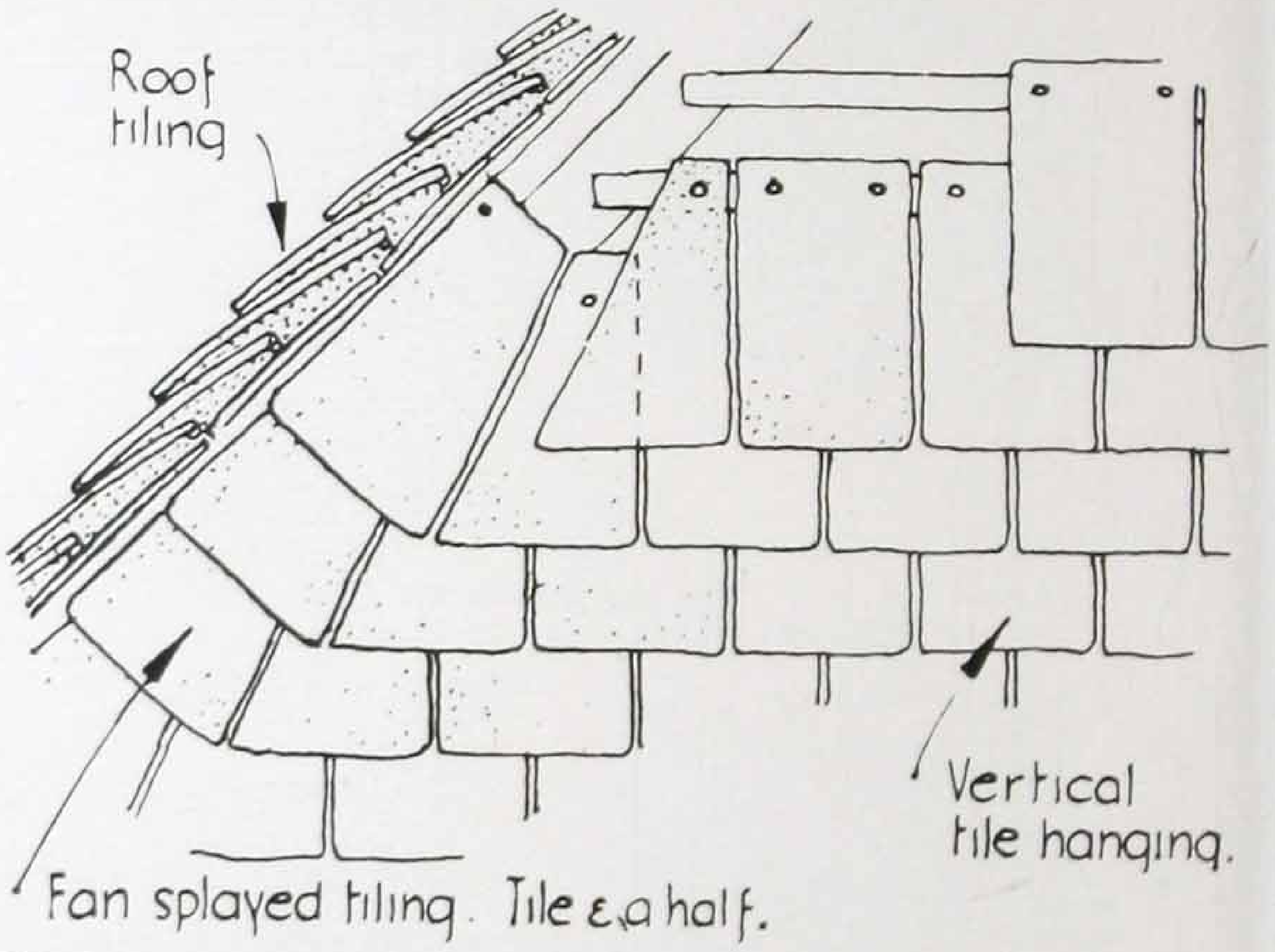
H & A Ltd



The Pitched Roof

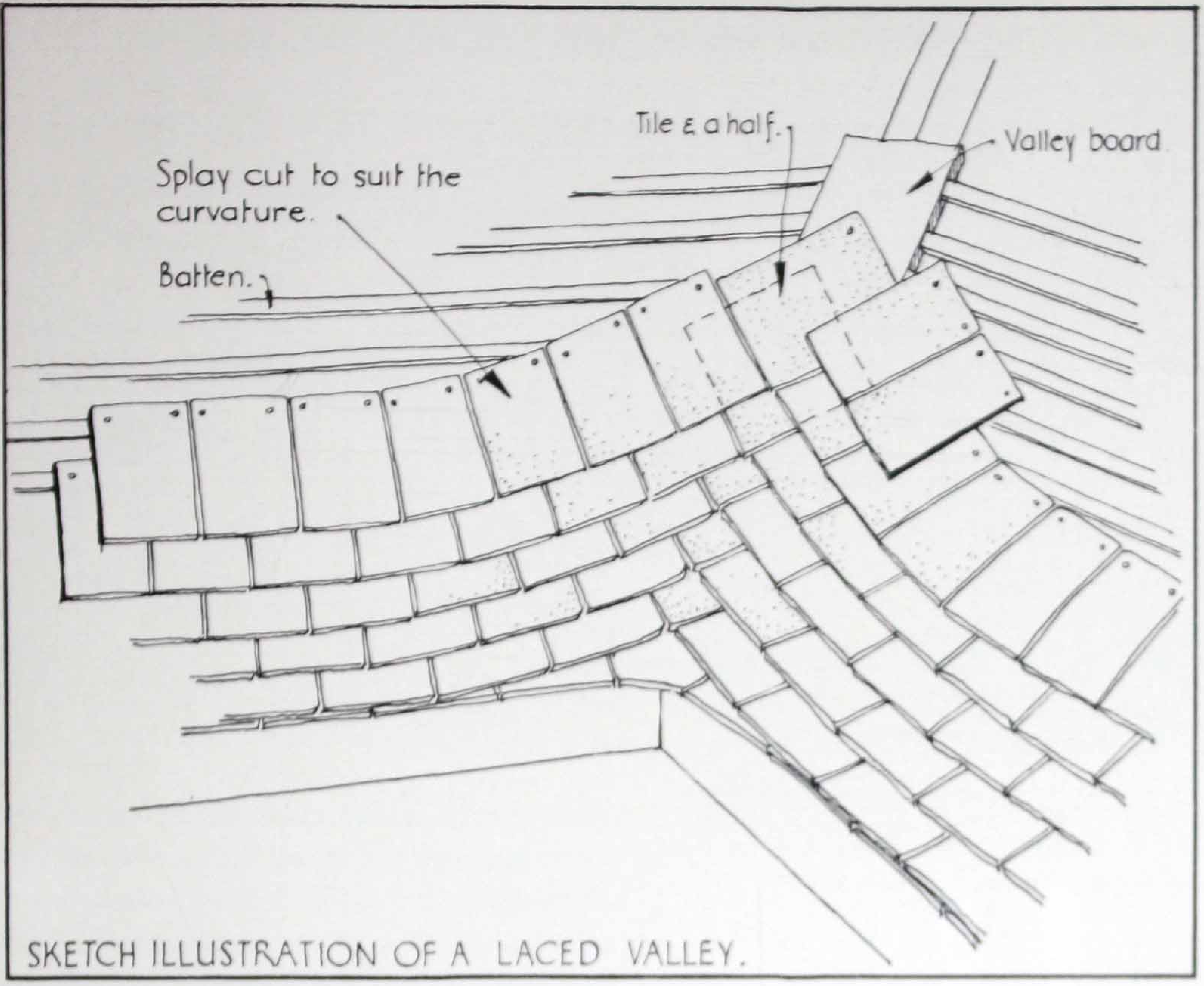
Some Details of Modern Clay Tile Work

Burnt clay tiles, manufactured by hand or machine from specially prepared and properly matured clays, may be divided into two main types : double-lap tiles and single-lap tiles. The double-lap type is represented by the ordinary plain roofing tile which is hung on simple horizontal battens to overlap in such a way that they use everywhere at least two thicknesses of tiling. Owing to their simple form of handiness plain tiles are specially suitable for complex roof plans.

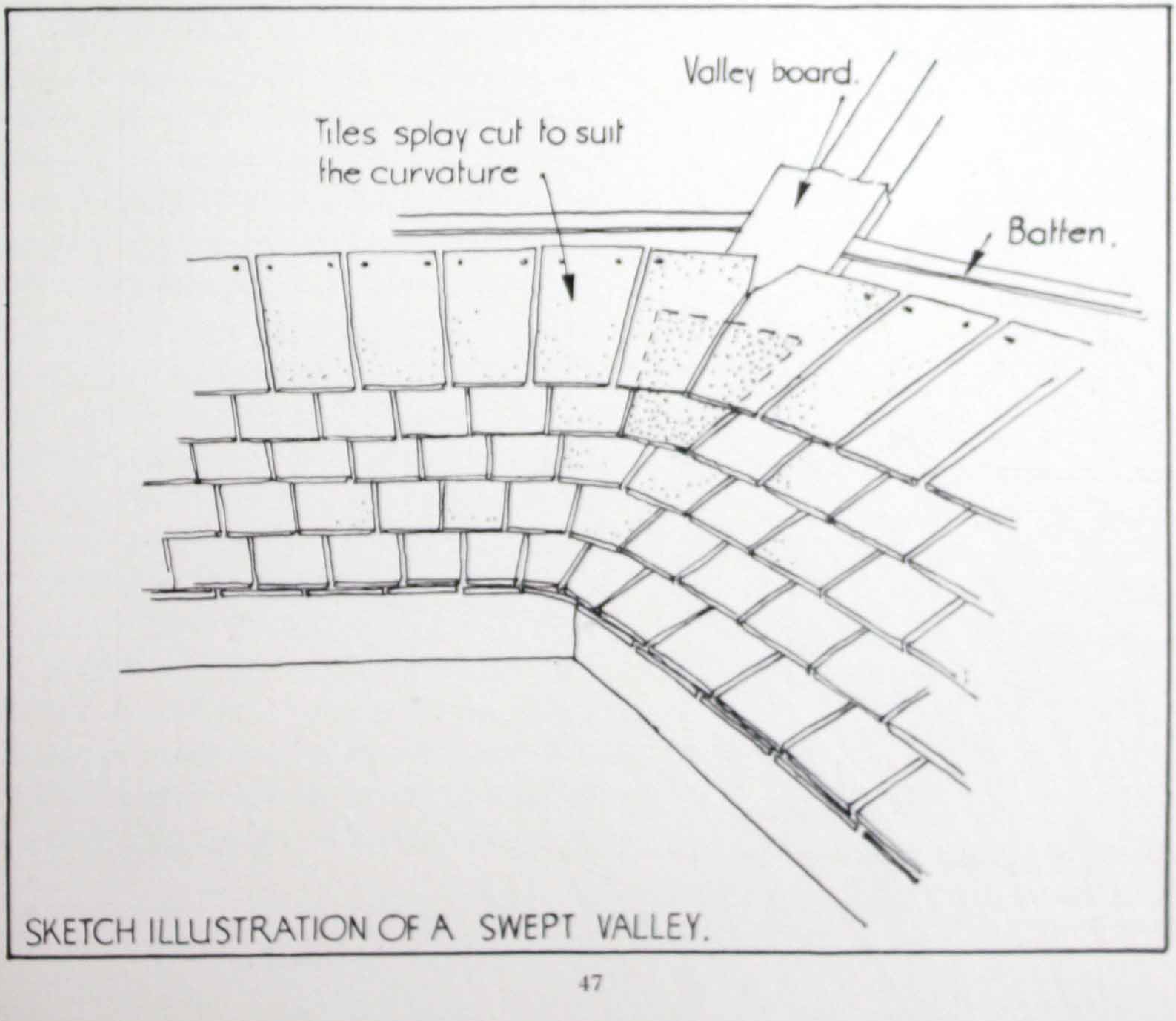


DETAIL OF FINISH AT SLOPING VERGE: THE WINCHESTER CUT

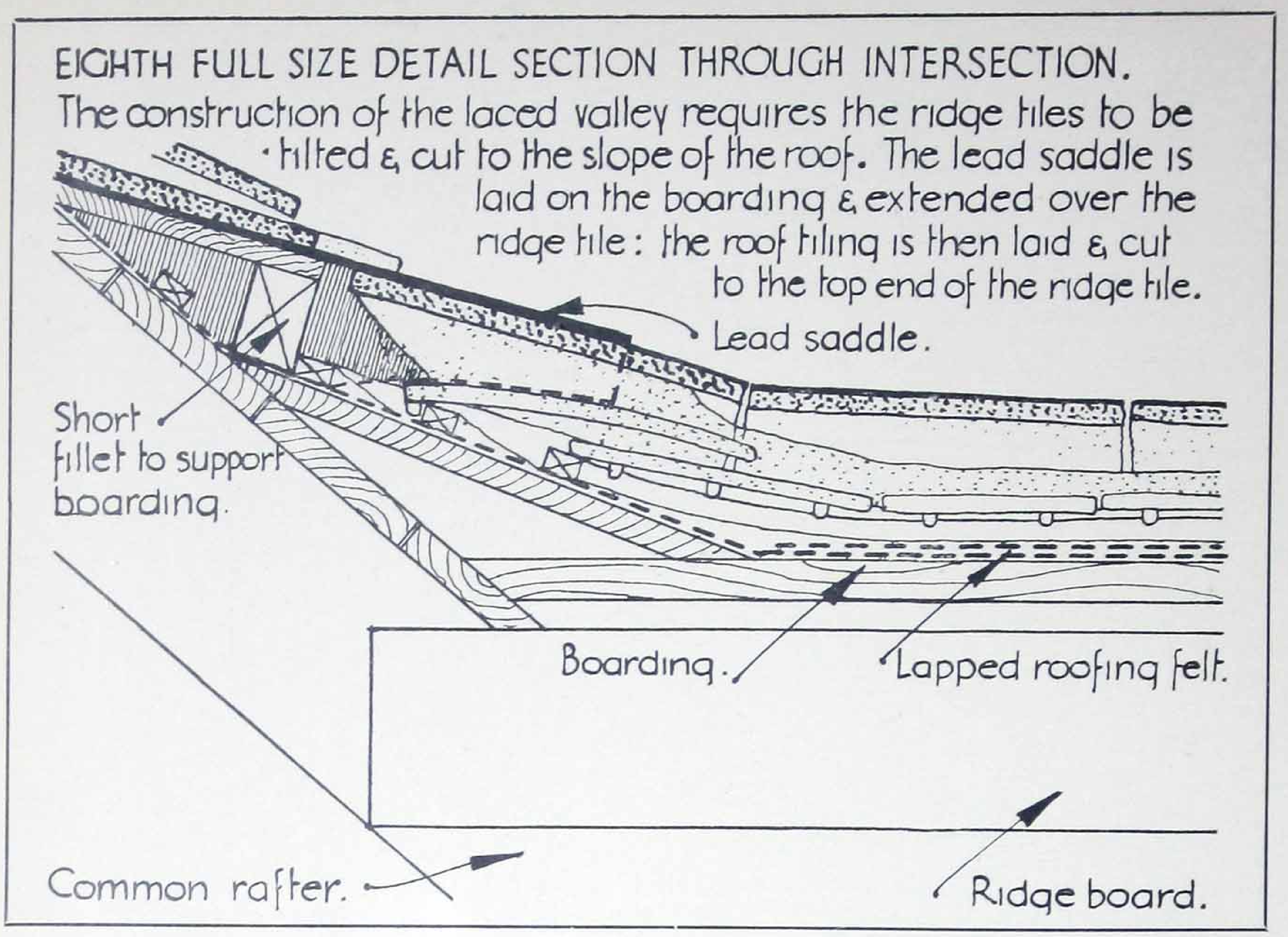
Various distinctive forms of the second (single-lap) type are produced, varying from the bold roll of the pantile and Spanish tile to the less emphatic Roman, double Roman and Italian styles. These single-lap tiles overlap each other at the edges only, but since, owing to their shape, this overlapped joint is waterproof, no more than the single thickness of tiles is required to give an efficient roof. Moreover, since the clays are amenable to accurate moulding, interlocks can be introduced at the edges to seal the joints between individual tiles.



SKETCH ILLUSTRATION OF A LACED VALLEY.

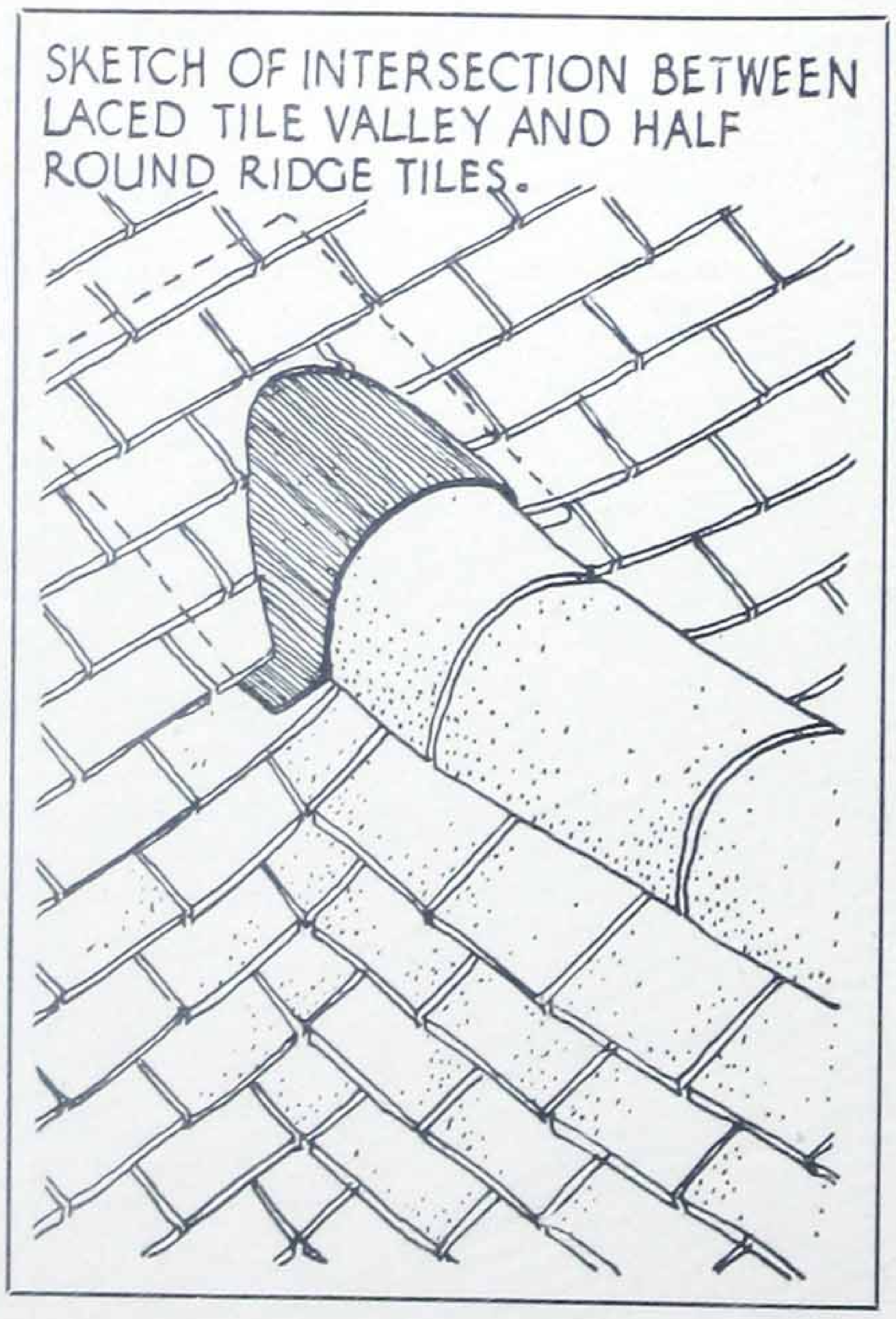


SKETCH ILLUSTRATION OF A SWEPT VALLEY.



EIGHTH FULL SIZE DETAIL SECTION THROUGH INTERSECTION.

The construction of the laced valley requires the ridge tiles to be tilted & cut to the slope of the roof. The lead saddle is laid on the boarding & extended over the ridge tile: the roof tiling is then laid & cut to the top end of the ridge tile.



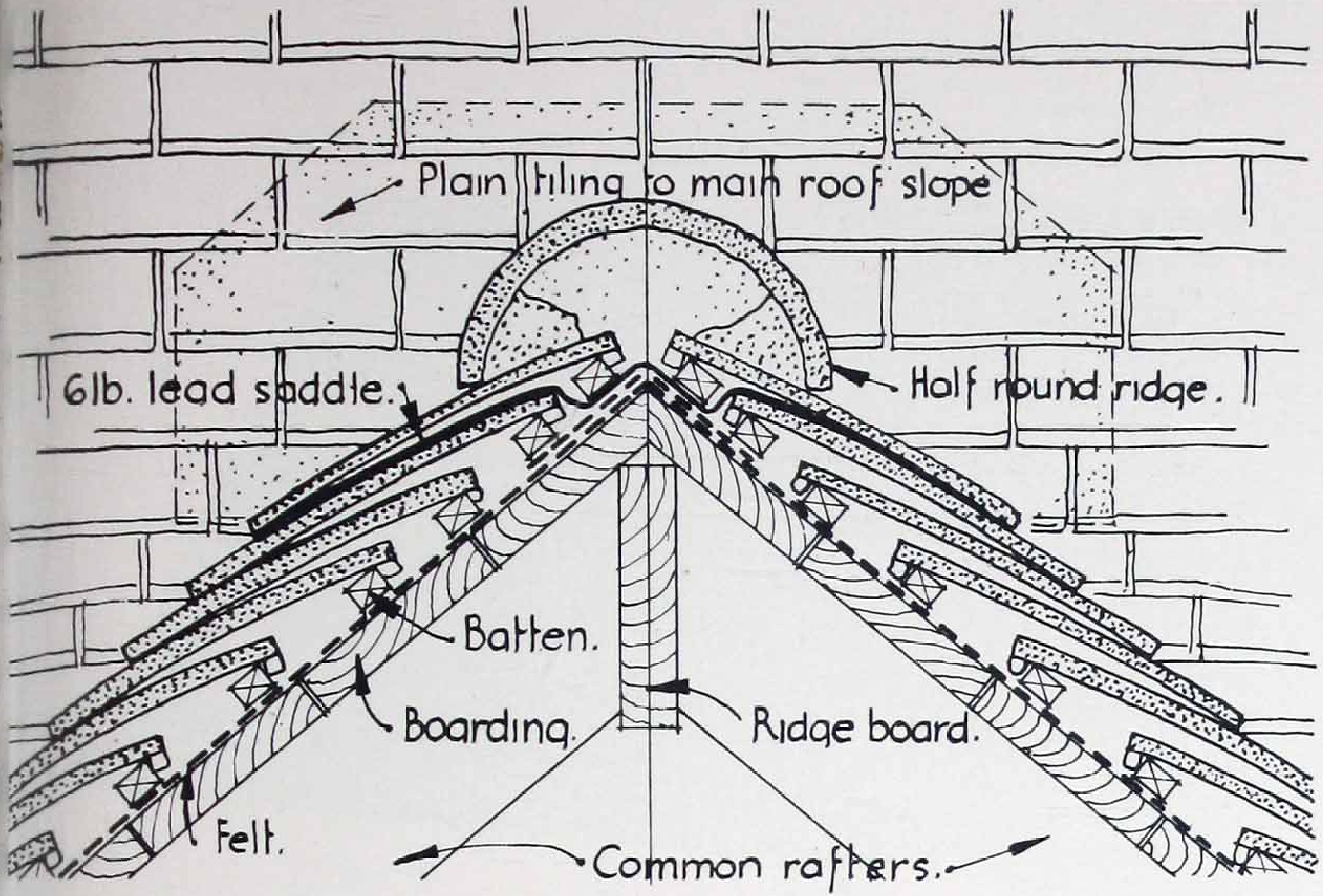
SKETCH OF INTERSECTION BETWEEN LACED TILE VALLEY AND HALF ROUND RIDGE TILES.

For a roof broken with hips and valleys the plain tile is the more adaptable. The construction of a water-tight valley is the trickiest part of tiling, the valley having to deal with the water from the two adjacent slopes. The various methods of constructing a valley in plain tiling may be divided into two kinds; those which rely on an ancillary sheet-metal channel, as in the lead-lined valleys with mitred tiles, and those which are constructed entirely of tiles. Tiled valleys are formed with special valley tiles or with plain tiles laid to form a laced or swept valley.

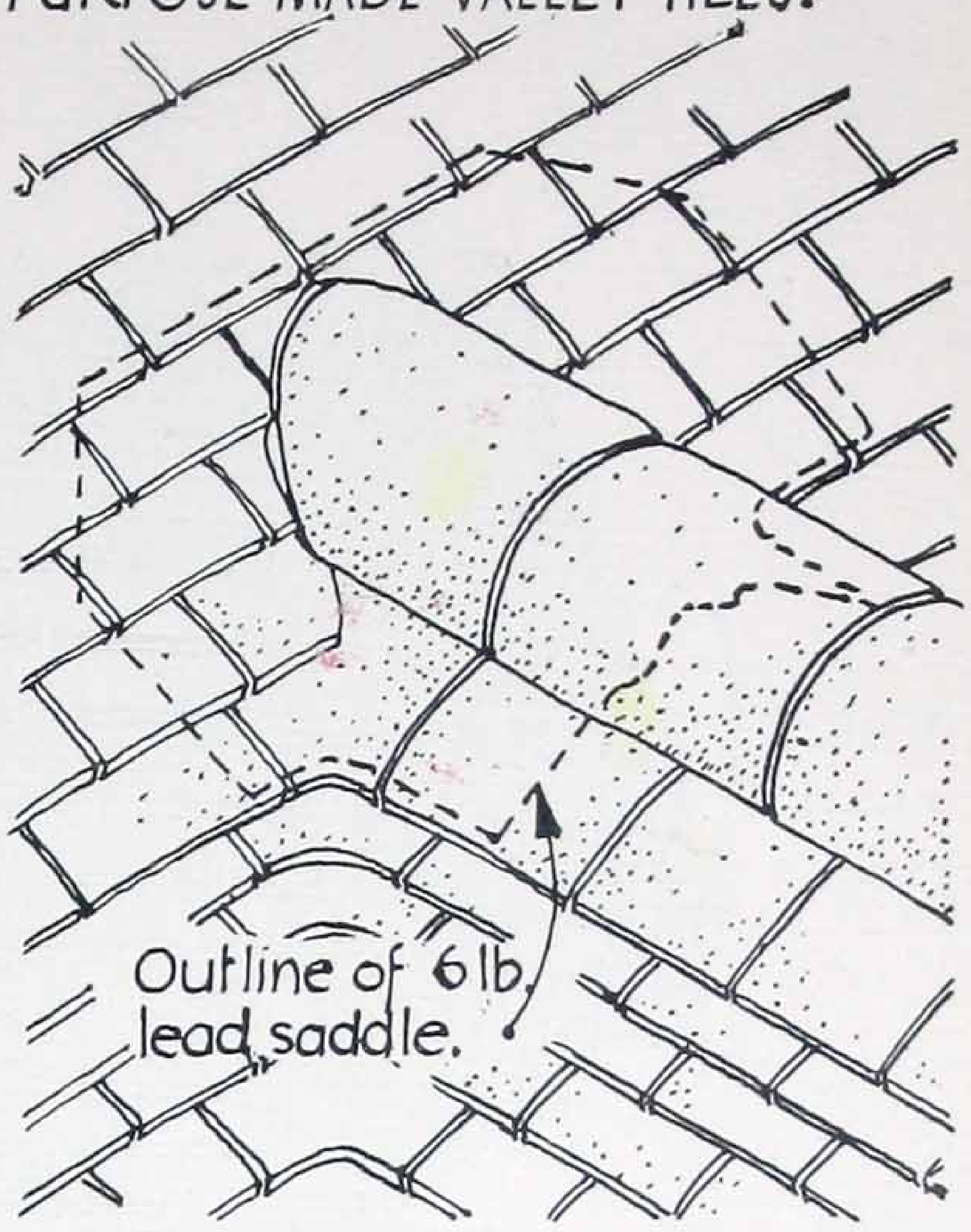
The open lead gutter is sometimes adopted where roofs of different pitches meet, but forms an unpleasant break in the appearance of the roof. Angular valley tiles suitable for most intersections are obtainable from all reputable manufacturers, and there is therefore little excuse for the open lead gutter. The lead should be carried well up under the tiles over a tilting fillet. The mitred valley with a secret lead gutter has a fairly neat appearance, but is liable to become choked with dirt.

Valley tiles to match the main body of the tiling are made in angular or rounded forms to suit all

IGHTH FULL SIZE DETAIL OF LEAD SADDLE AT THE INTERSECTION:



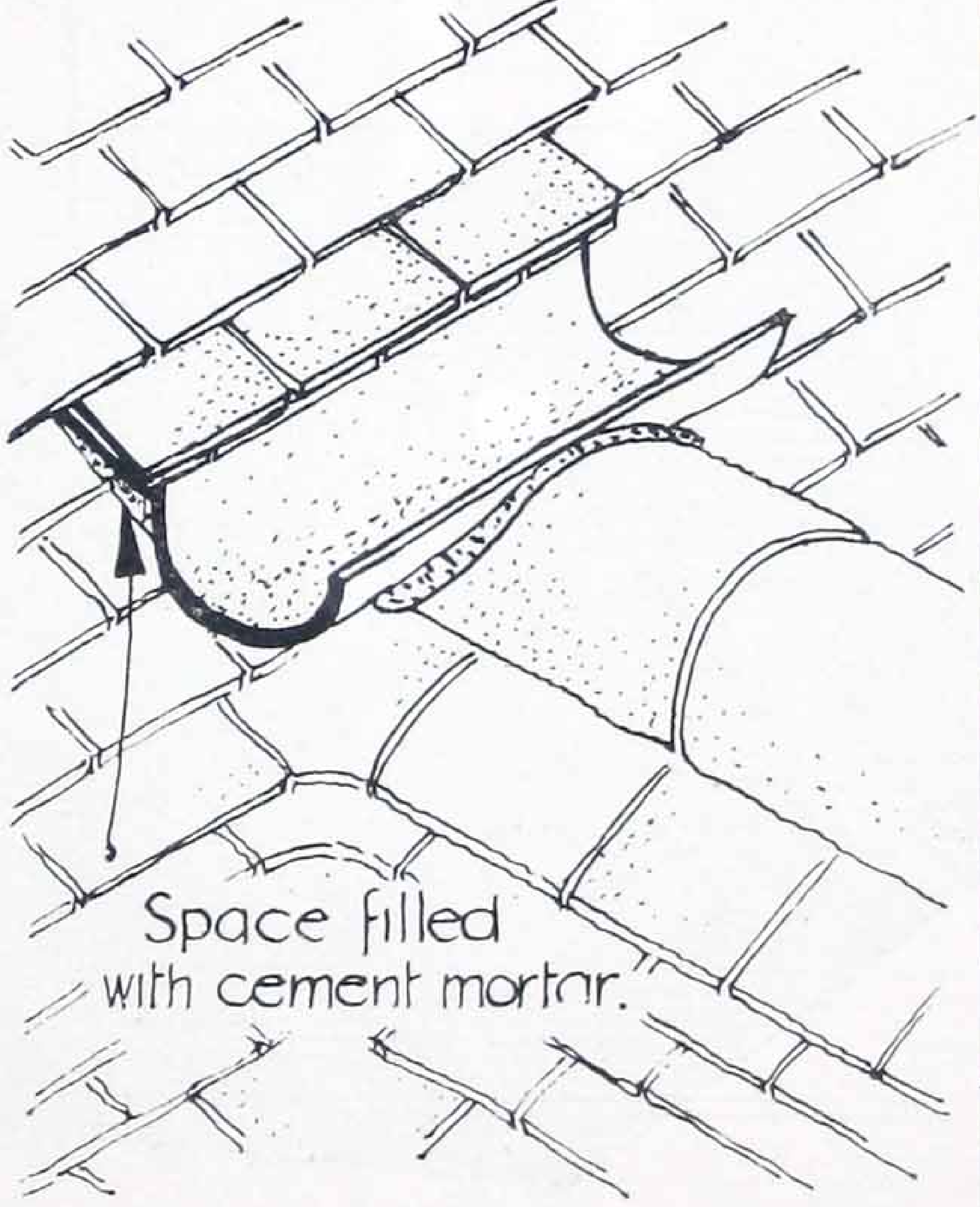
SKETCH OF INTERSECTION BETWEEN HALF ROUND RIDGE TILES AND PURPOSE MADE VALLEY TILES.



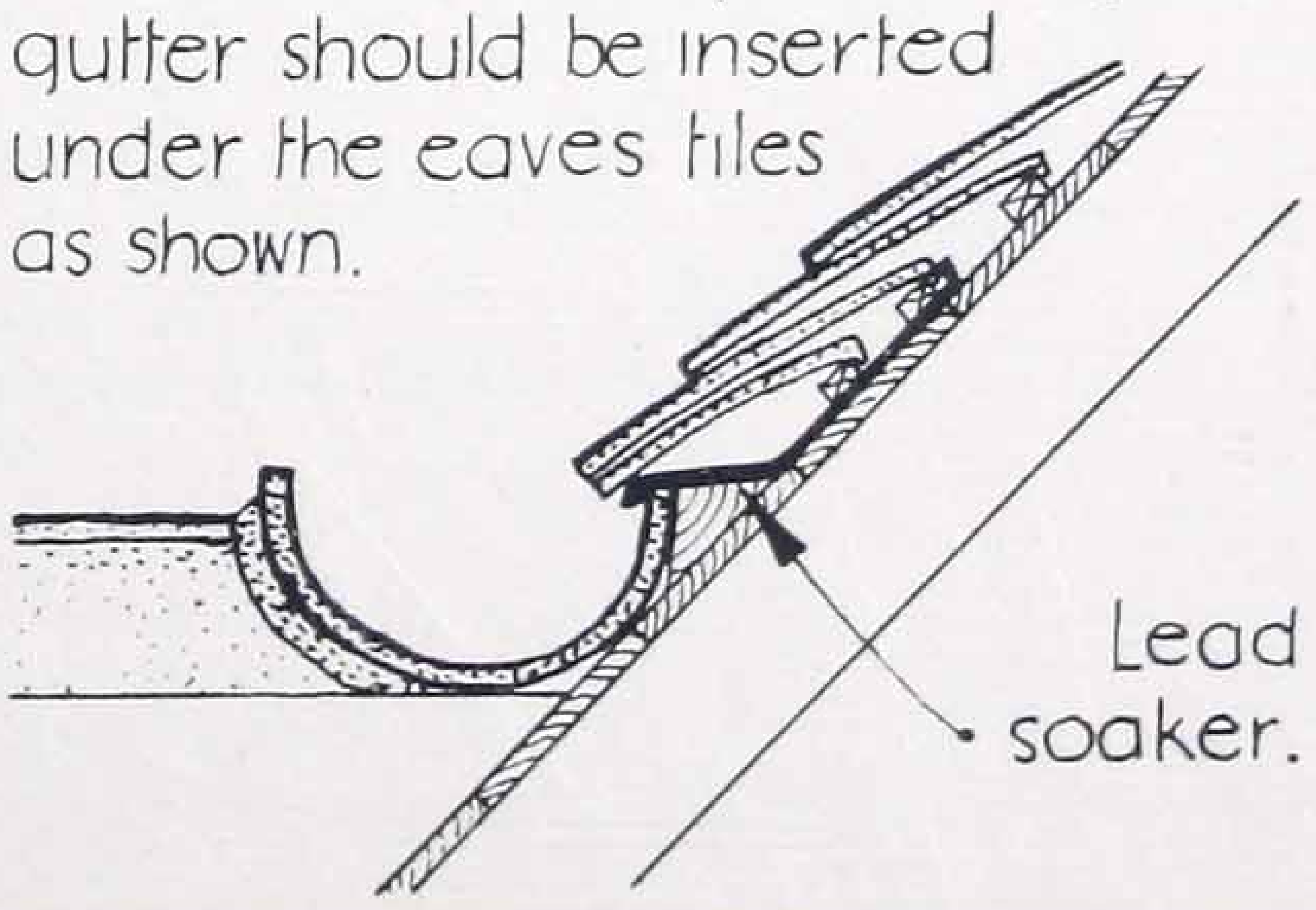
normal roof pitches. In practice, they are only applicable where the horizontal section through the valley approximates to 90°, specially made valley tiles having to be obtained for acute or obtuse angles. Their appearance is good and effectively preserves the sweep of the roof. The laced and swept valleys are probably the best forms taken by valley tiling. They deal effectively with the roof drainage, avoiding the concentration of water in a narrow channel, and they look extremely well. They are, indeed, the traditional methods of constructing a valley in tiles and the highest test of a tiler's skill. In its modern form the laced valley consists of a tile-and-a-half laid diagonally in the middle of the valley in each course with the tile course on each side curving up as shown in the sketch. The only auxiliary construction needed is a 9-in. or 11-in. board laid along the length of the valley over the battens, the step between this board and the battens being eased on either side by a length of feather-edged boarding.

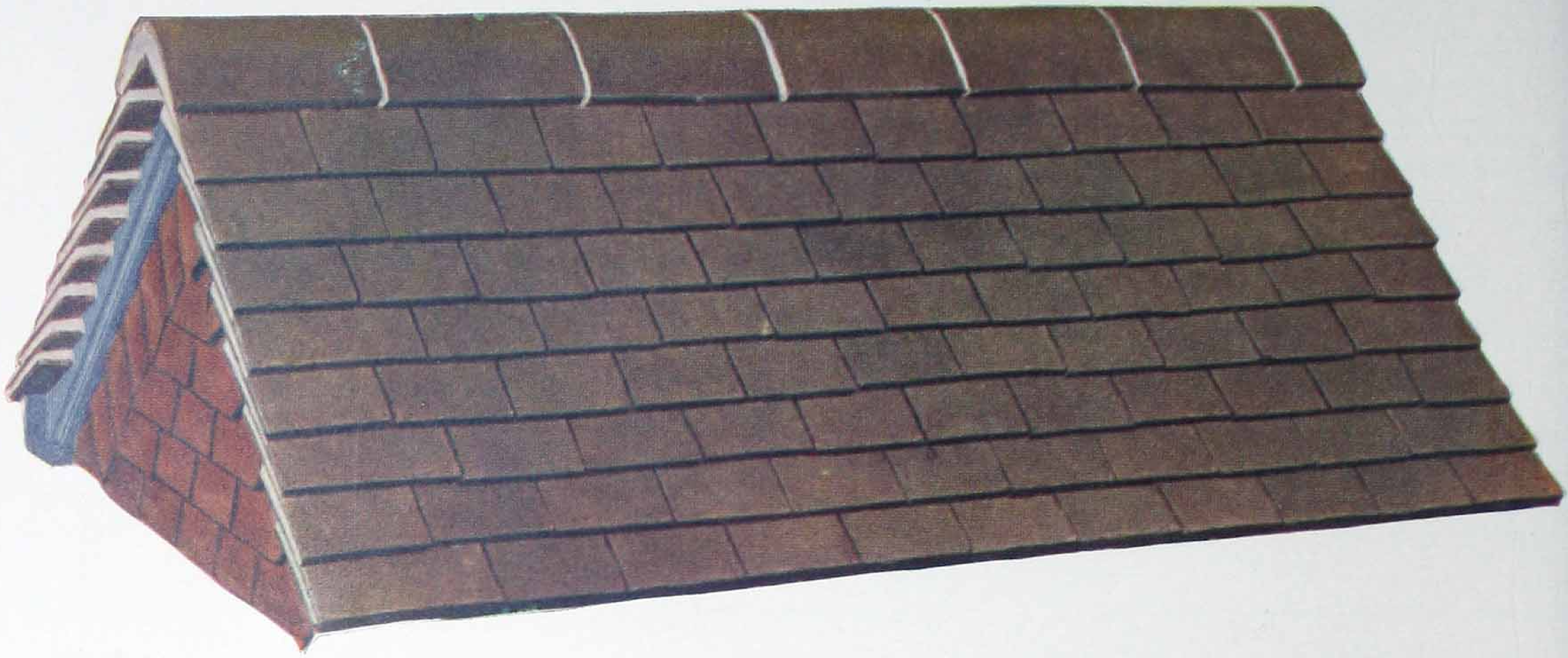
The laying in a swept valley differs from the laced valley in that the courses of tiling are kept horizontal, the tiling battens being taken

SKETCH OF INTERSECTION WHERE HALF ROUND TILE OF RIDGE MEETS PITCHED ROOF, SHOWING USE OF INVERTED RIDGE TILE GUTTER.

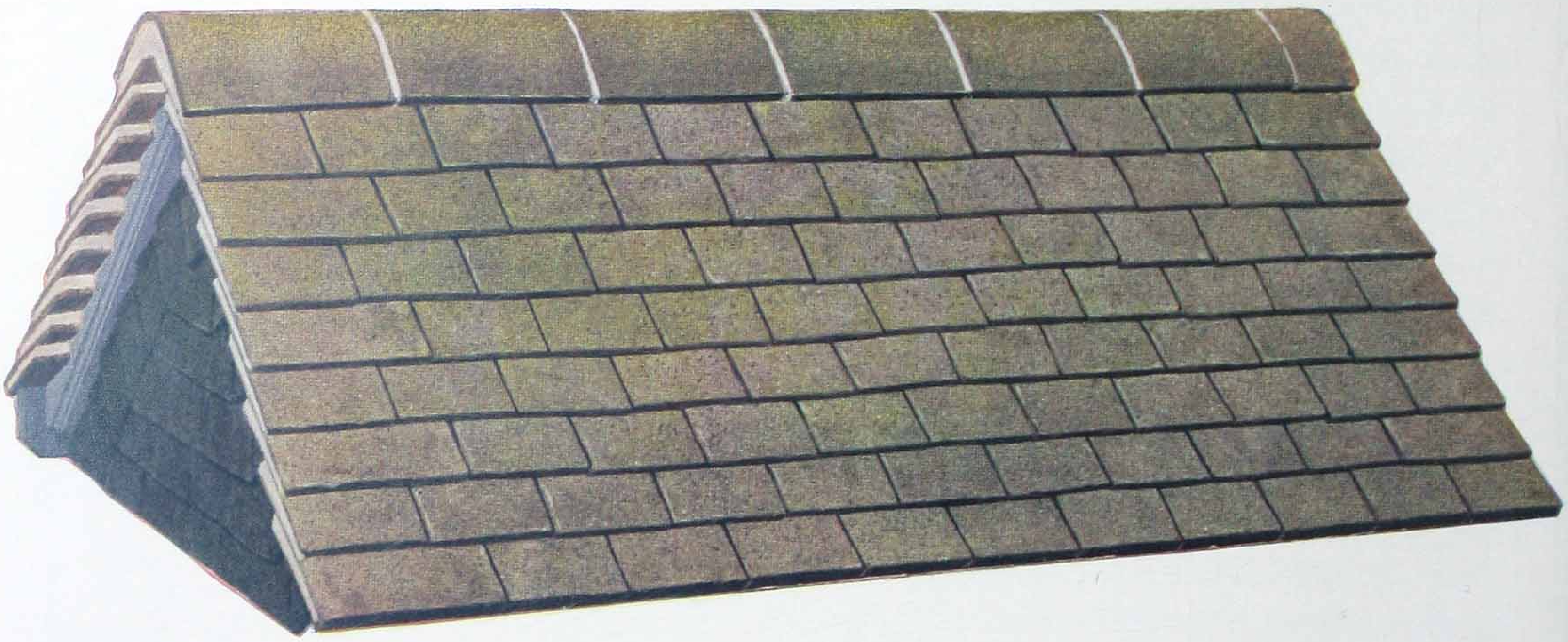


A lead soaker the full width of the gutter should be inserted under the eaves tiles as shown.



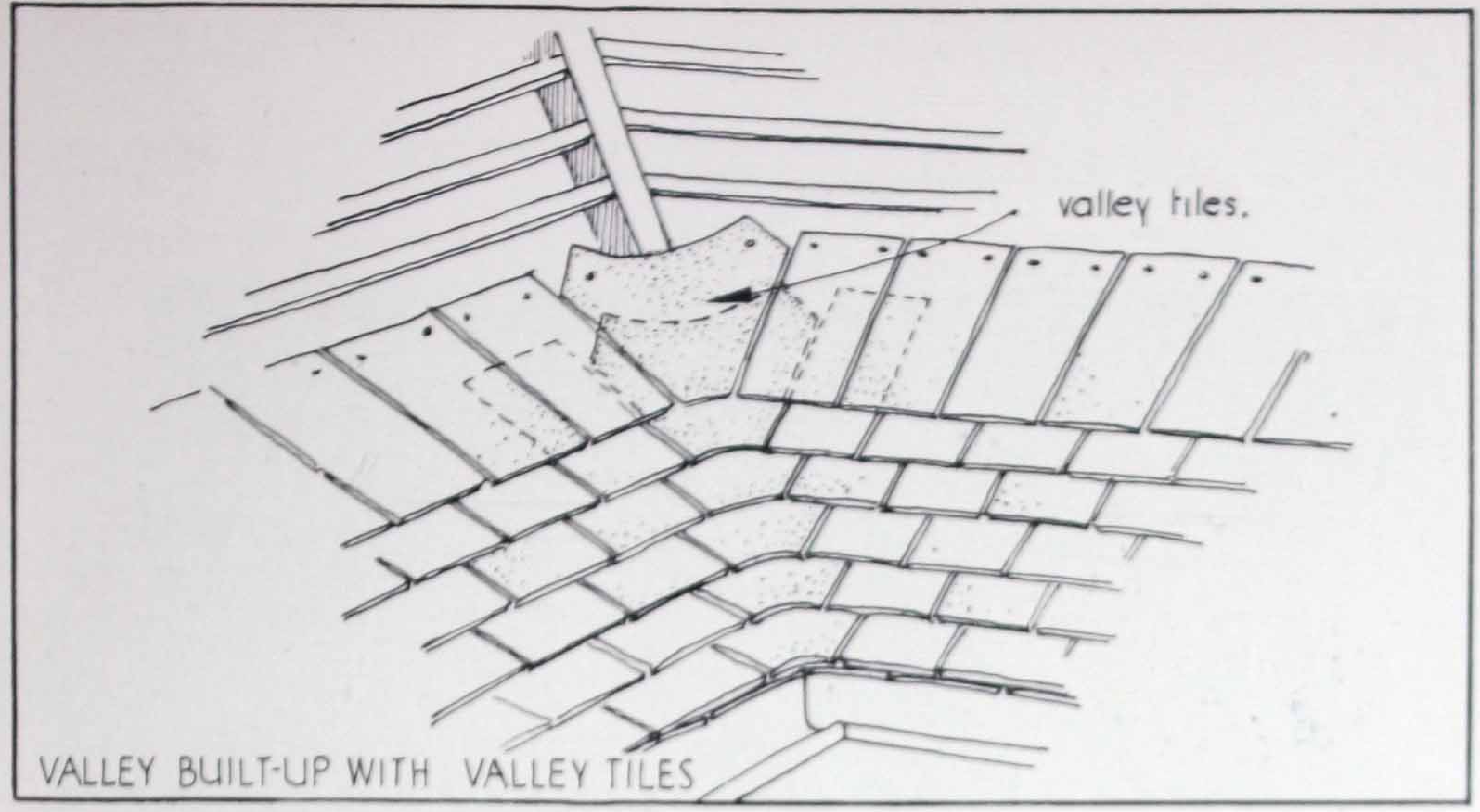


DUN BROWN

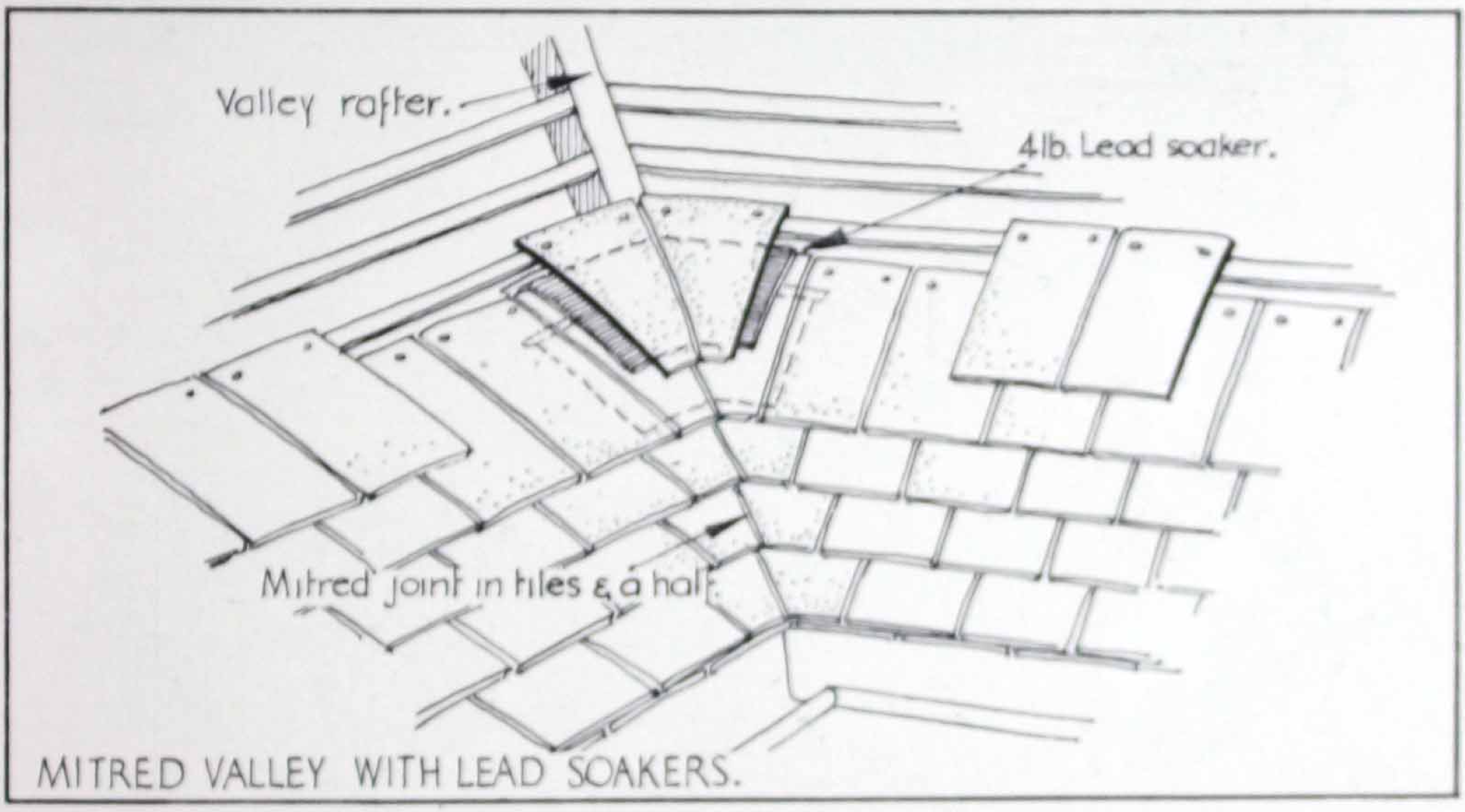


CRYSTAL GREY

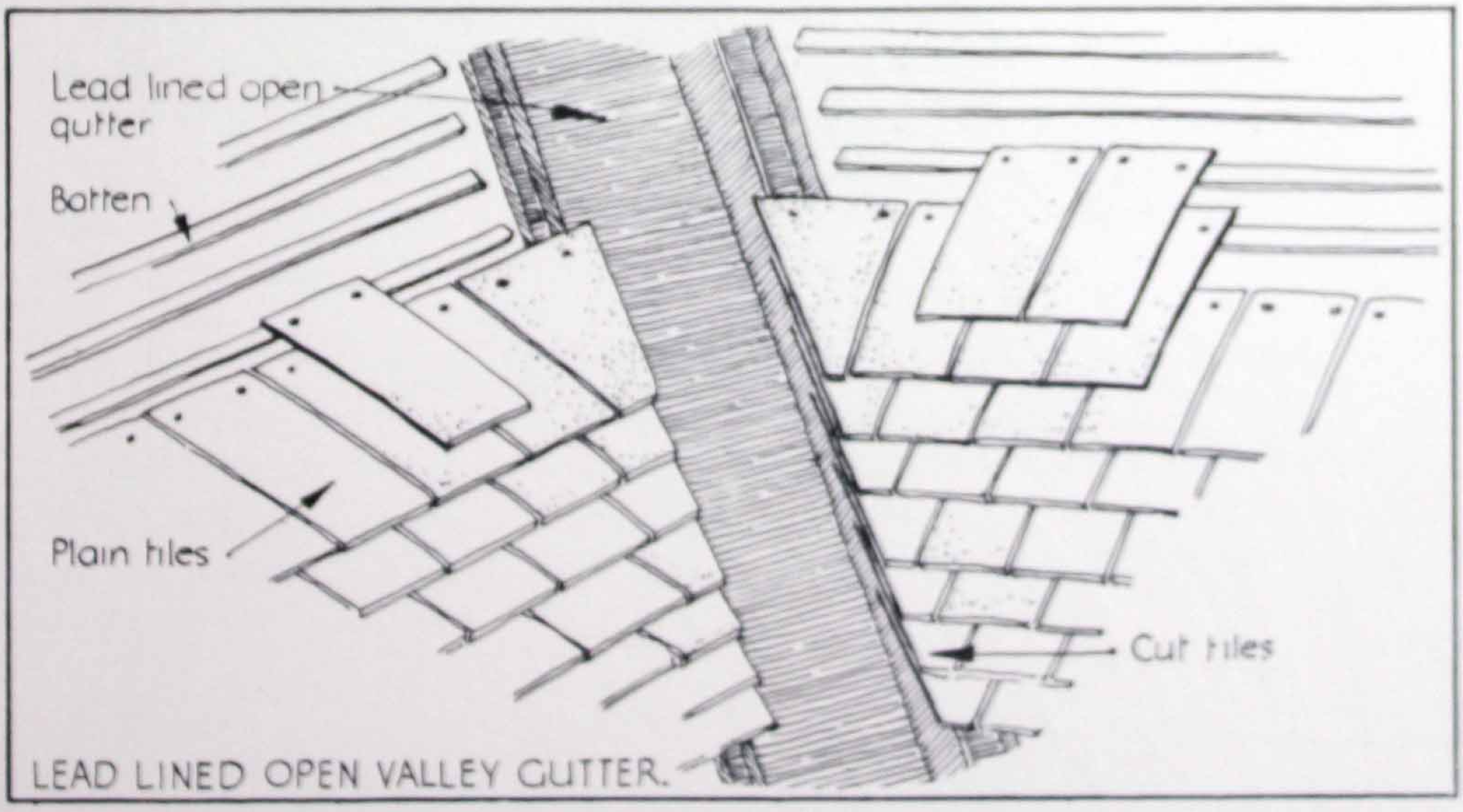
The above can be supplied in Century Hand-Made or Sandstorm.



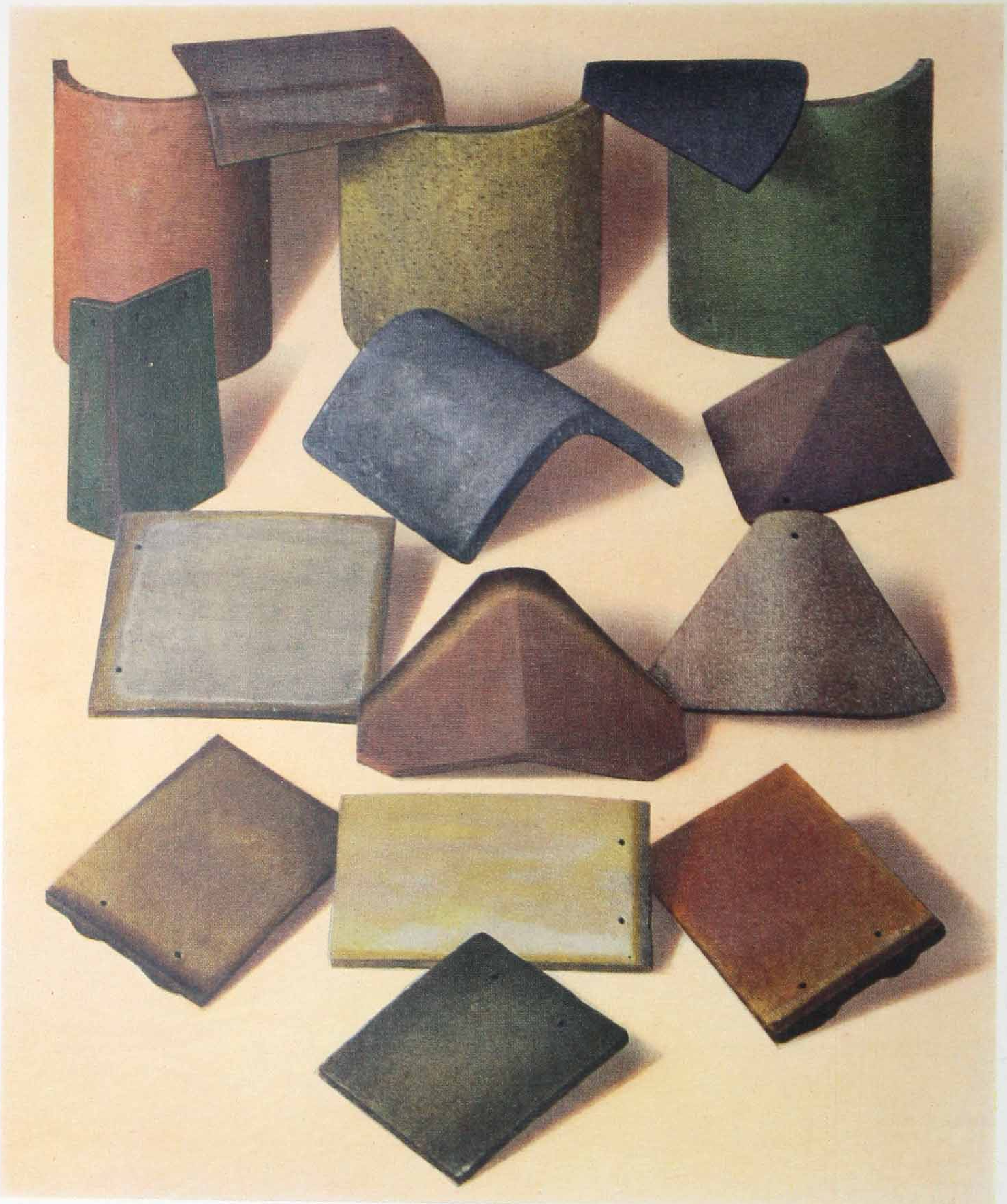
VALLEY BUILT-UP WITH VALLEY TILES



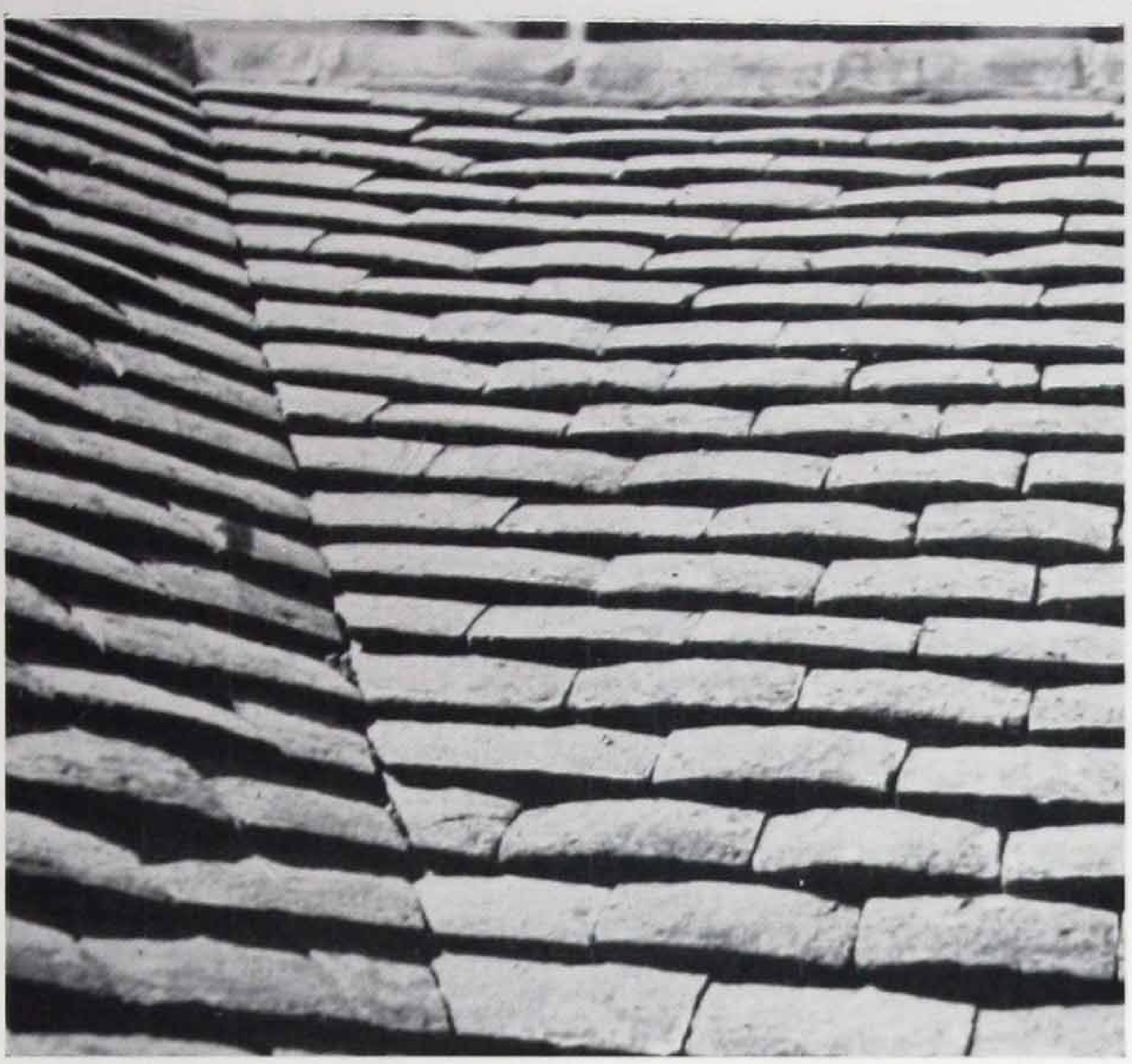
MITRED VALLEY WITH LEAD SOAKERS.



LEAD LINED OPEN VALLEY GUTTER.



Group of some of the Products showing various
Shapes and Colours.

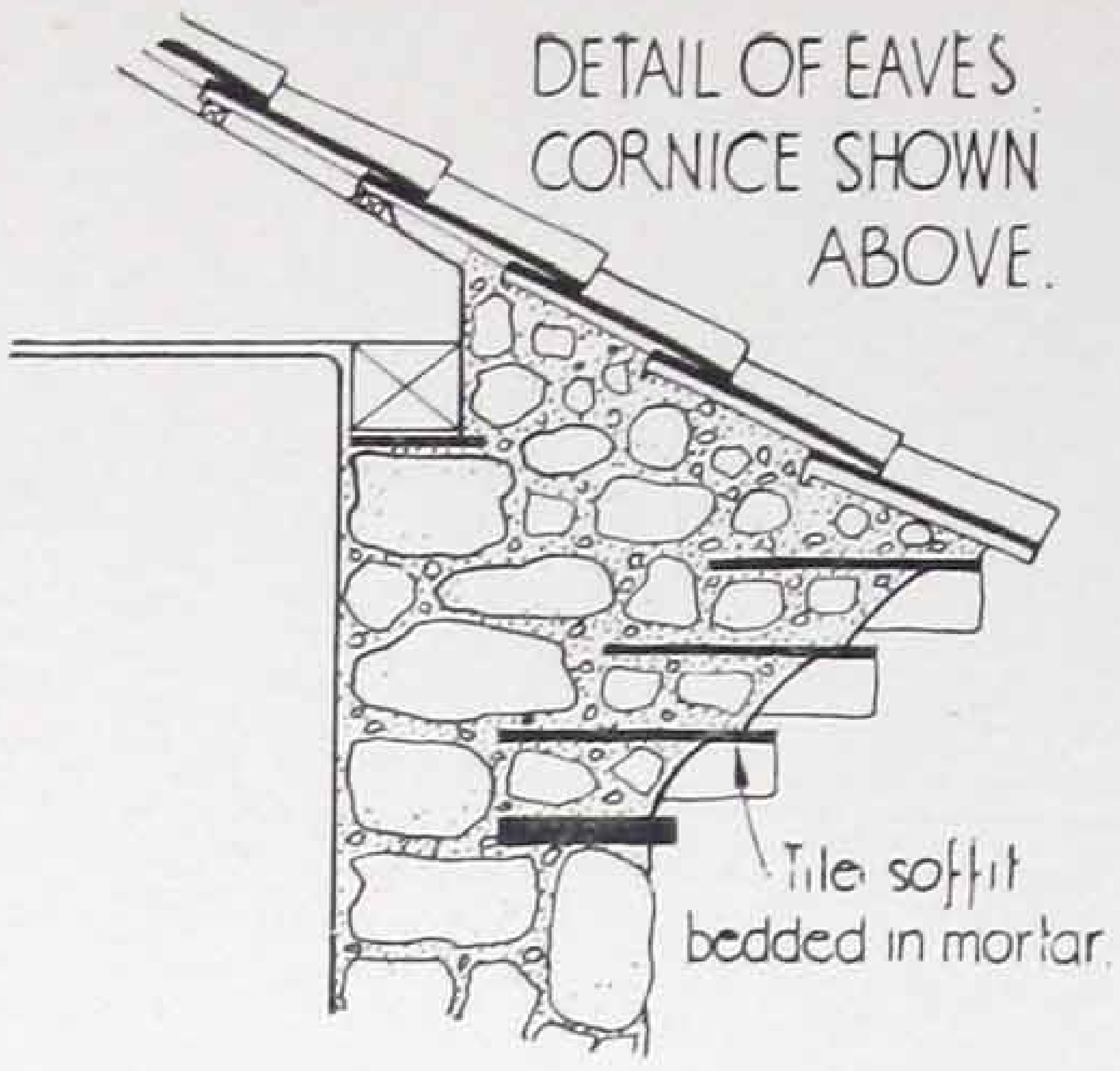


horizontally over the centre board and the valley tiles splay-cut to take the sweep. A considerable amount of cutting is necessary and care has to be taken to allow for breaking joint in each course.

The swept valley is laid on a centre board and no flashings or other sheet-metal work is necessary. The effect of the continuous tiling around swept and laced valleys is very pleasant, giving a close, intimate covering to a building and a sense of snugness, and avoiding too angular a shape to the roof.

Single-lap tiling is most suitable for the simple roof where its characteristic pattern is not interrupted by many valleys, which necessitate a good deal of cutting and the bedding of the smaller pieces needed to keep the line of the valley. On a roof of this kind, single-lap tiles are at their best, especially if the roof is of large enough dimensions to give them the appropriate scale. They are larger than the plain tile—about 13½-in. to 15-in. long, and 9-in. to 11-in. wide—and the gauge of a 13½-in. tile is 10-in. The pattern of single-lap tiling is therefore based on a much larger unit and further emphasised by the curves, rolls, corrugations and channels of the various types of tile.

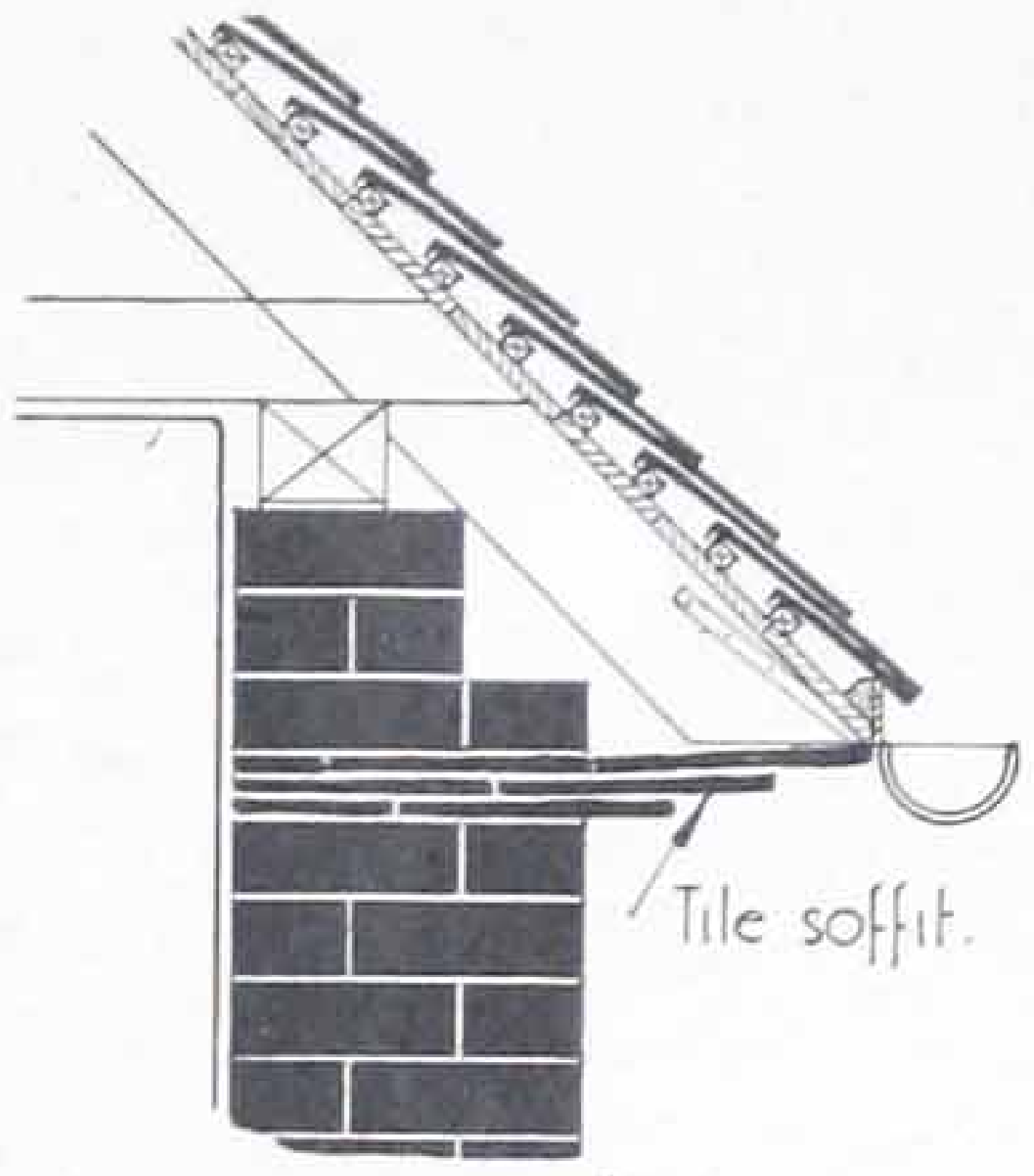
If the best is to be made of each type of tile—plain or single-lap—and that means if the best is to be made of the roof, the design of the roof is the fundamental factor to be considered. Plain tiling for the complicated roof and single-lap tiling for the simple roof is not a rule to which there must be no exception, but, on the whole, it indicates the associations in which the best results may be expected from the point of view of both appearance and construction.


DETAIL OF EAVES CORNICE SHOWN ABOVE.
Tile soffit bedded in mortar.

Roofing Tile Details

The study of tiling work consists, in practice, of the study of tile detail, and it is surprising how many small but interesting details are evolved in the course of normal work, yet which pass unnoticed.

◆

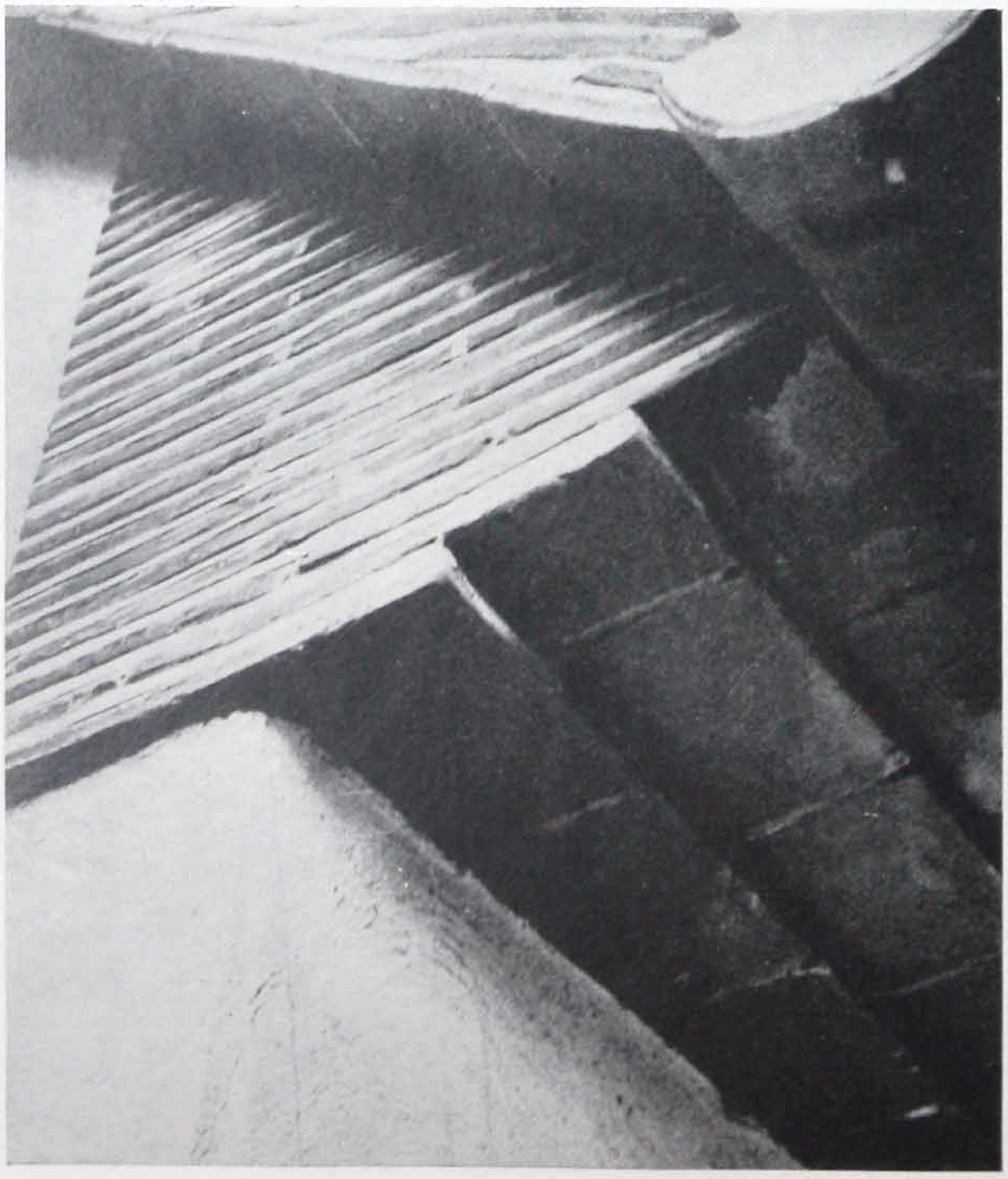


DETAIL OF TILED SOFFIT SHOWN BELOW.

Eaves

The three photographs on pages 55 and 56 illustrate some tile details of the finish of the eaves, which, are described in the following paragraphs.

In this illustration plain tiles have been used and built out in three courses, each projecting beyond the other, with a solid filling of brick above to give solidity and bearing for the wallplate. Either hand-made or machine-made tiles are used in this work, but the nibs, of course, must be knocked off when nibbed tiles are used. In this example, it being a modern one, a half-round gutter has been fitted and is supported in the usual way with wrought iron brackets, carried back and fixed to the foot of the rafters. The effect obtained is one of solidity without heaviness since the continuous lines formed by the edge of the projecting tiles do much to lighten the apparent weight of the soffit.

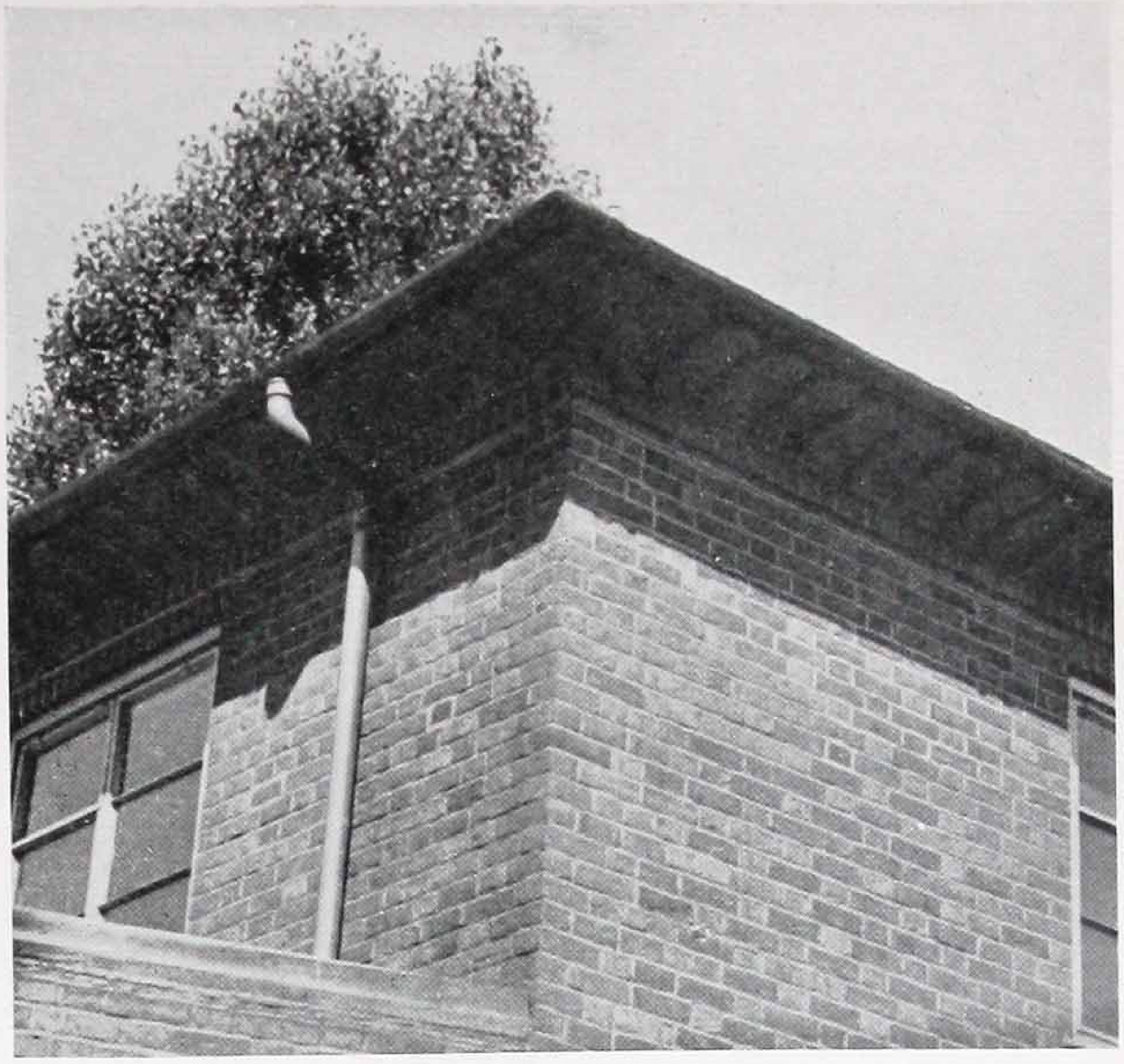


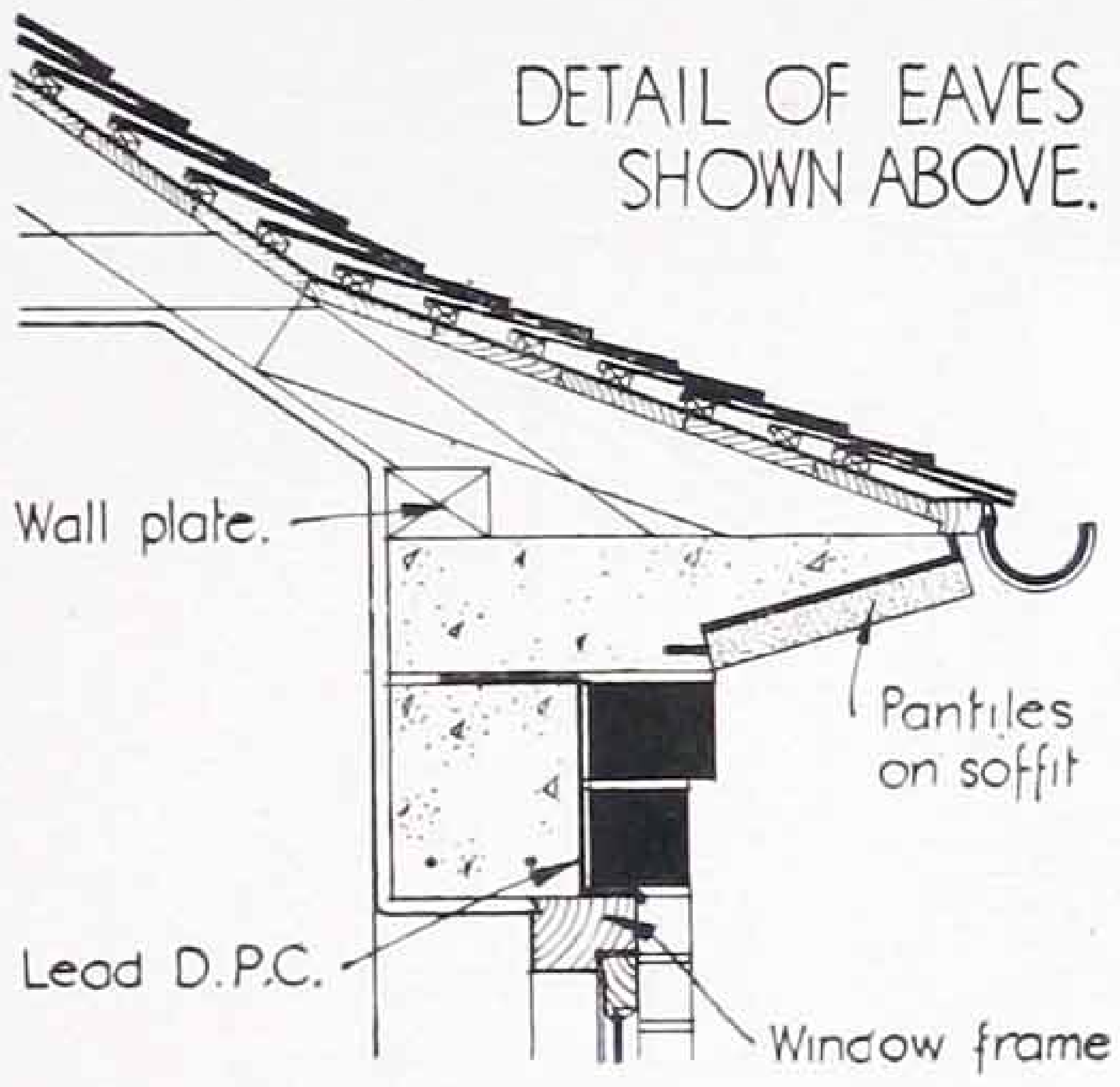
A fairly broad soffit formed in one tile is shown in accompanying photograph. This example was designed by Oswald P. Milne, F.R.I.B.A., and pantiles were used to match the roof itself. The interest, from the appearance point of view, is mainly in the roll repeating itself throughout the length of the eaves.

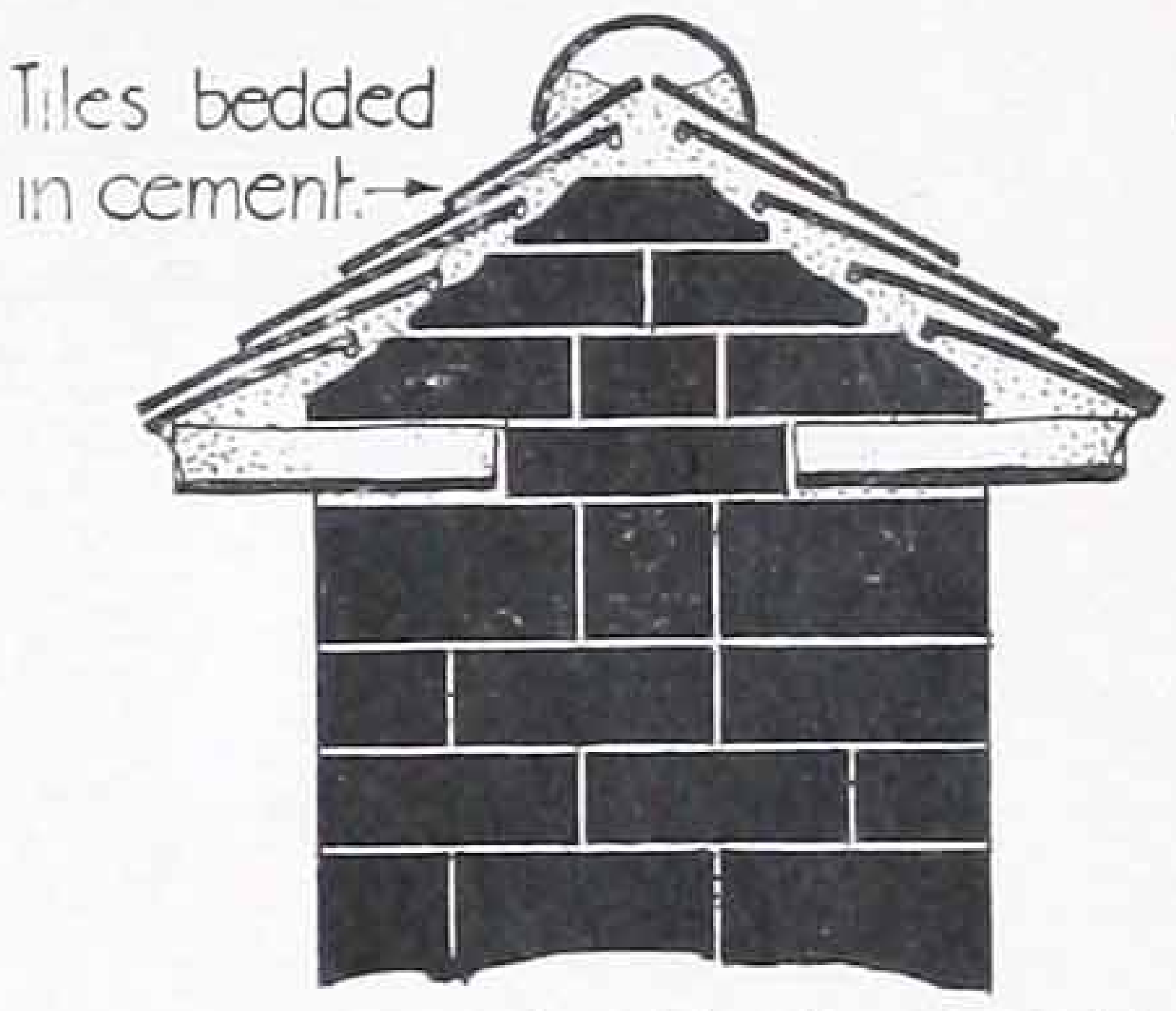
Another interesting variation, from the same group of buildings by the same Architect, is shown below in the lower illustration. This is not, strictly speaking, an eaves, but a fairly broad overhang to the tile capping on a screen wall. The normal half-round ridge tile of the shallow type has been used upside down to form the soffit, and since there is no gutter required the ends of the half-round tiles are exposed to view, giving both interesting high lights and interesting shade patterns which contrast in their effect with the relatively straight lines of the plain tiling above.

The soffit of the eaves shown on Page 56 is built up in overhanging courses of brickwork with a haunching at the ends built up in courses of plain tile.

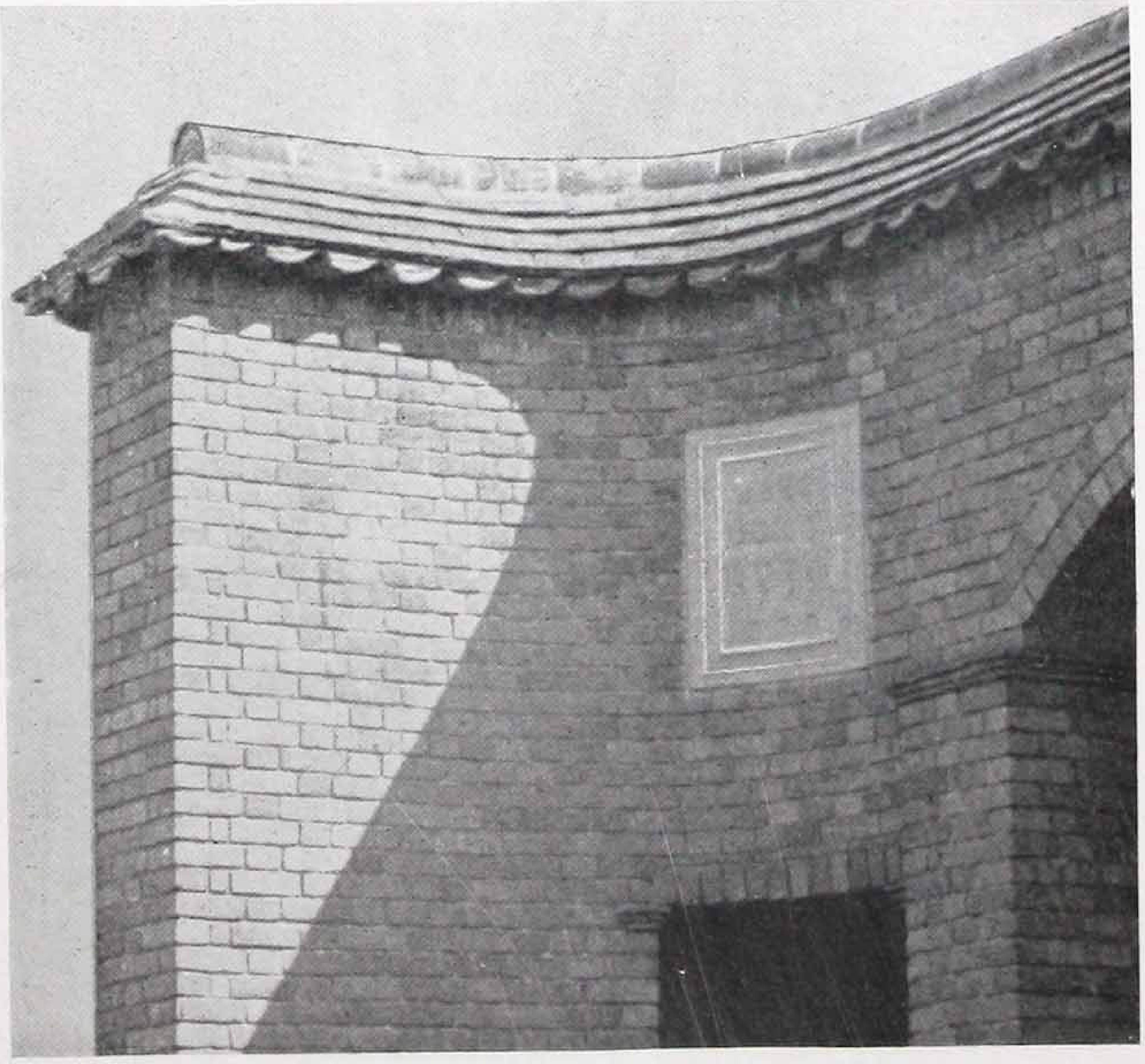
The more usual ways of finishing with an open eaves, with boarding above or below the rafters, or with a boarded or battened horizontal soffit, are all well known, and need not be dealt with here, but mention should be made of the devices commonly used for belling out the roof at the eaves with either heavy tilting fillets or with sprockets.

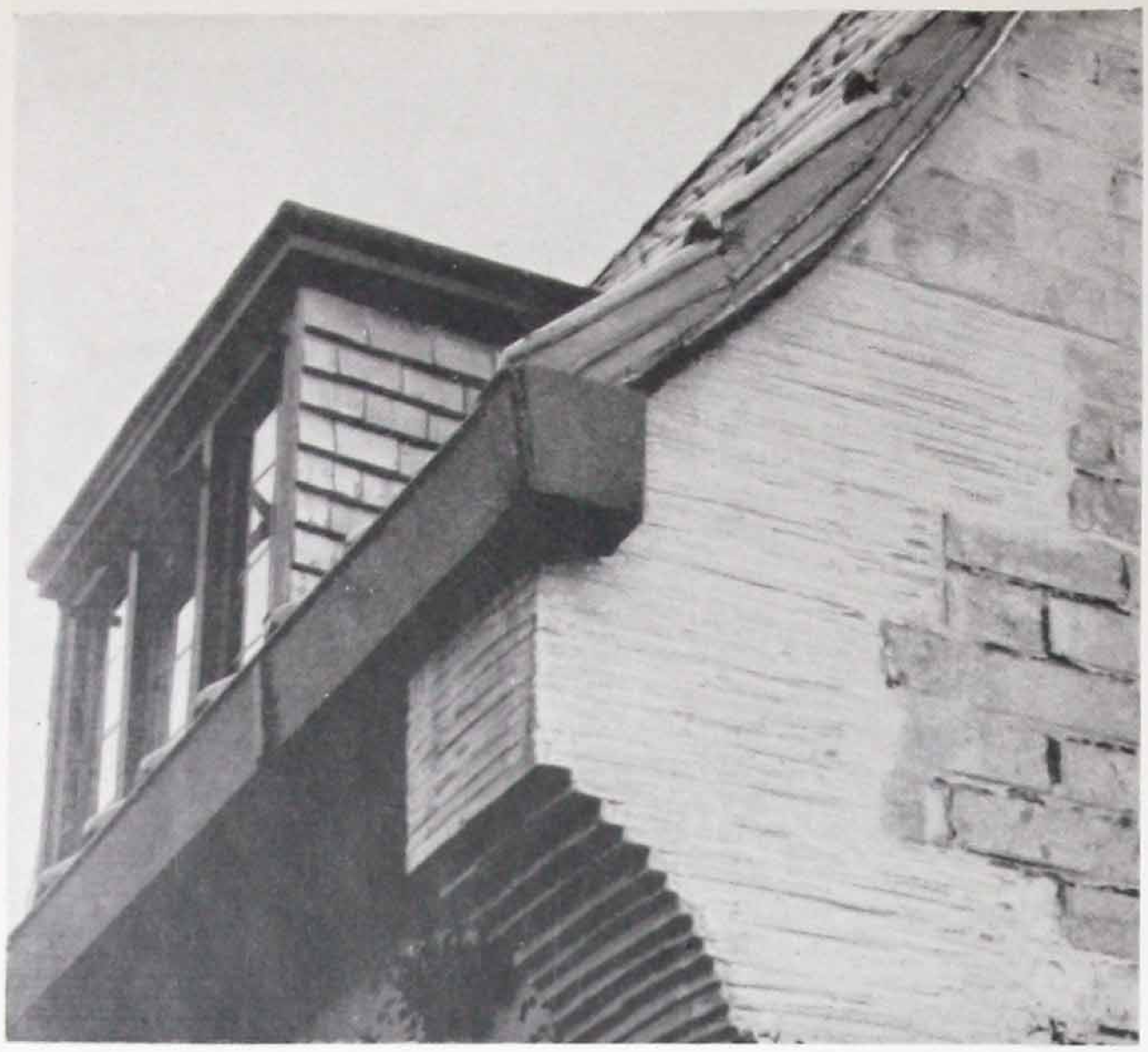



DETAIL OF EAVES SHOWN ABOVE.

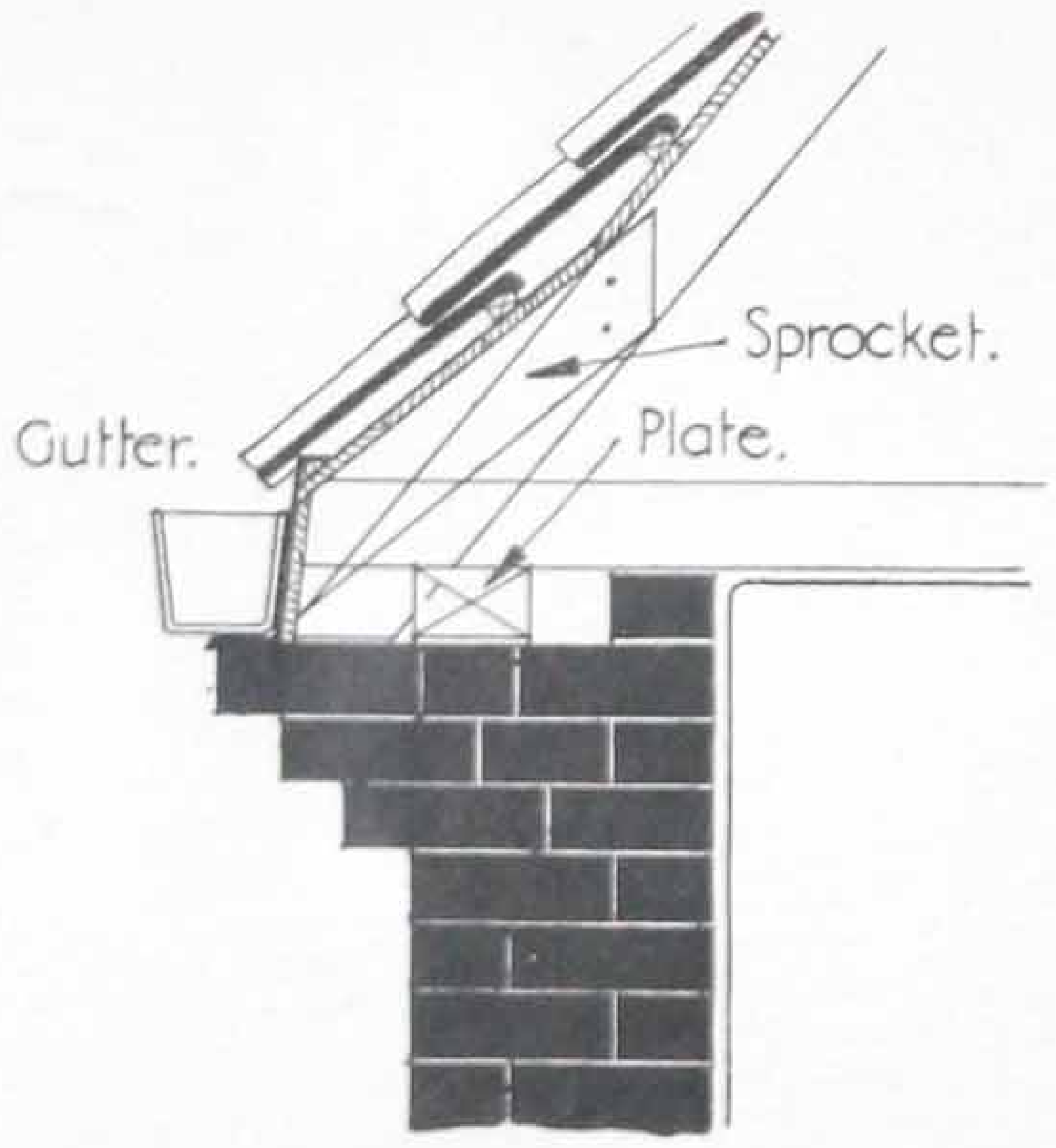


DETAIL OF PARAPET CAPPING WITH PROJECTION SHOWN BELOW.





The intention and the effect of the use of either of these methods is to reduce the pitch in the last half-dozen or more courses of tiling. While care is usually taken to ensure that the pitch of the main roof is adequate, the reduction in the pitch at the eaves when sprockets are used is often overlooked, with the result that the lower courses are laid at a pitch which is less than should be permitted in good work. The question of roof pitch is dealt with fully in Information Sheet No. 445, issued by the Clay Products Technical Bureau and on page 28 of this Catalogue, and in the careful analysis there given the various pitches advisable for different exposures and types of construction are set out. Considerations of construction and exposure should always be taken into account, but in general 37½ degrees should be regarded as the absolute minimum rafter pitch which may be used.



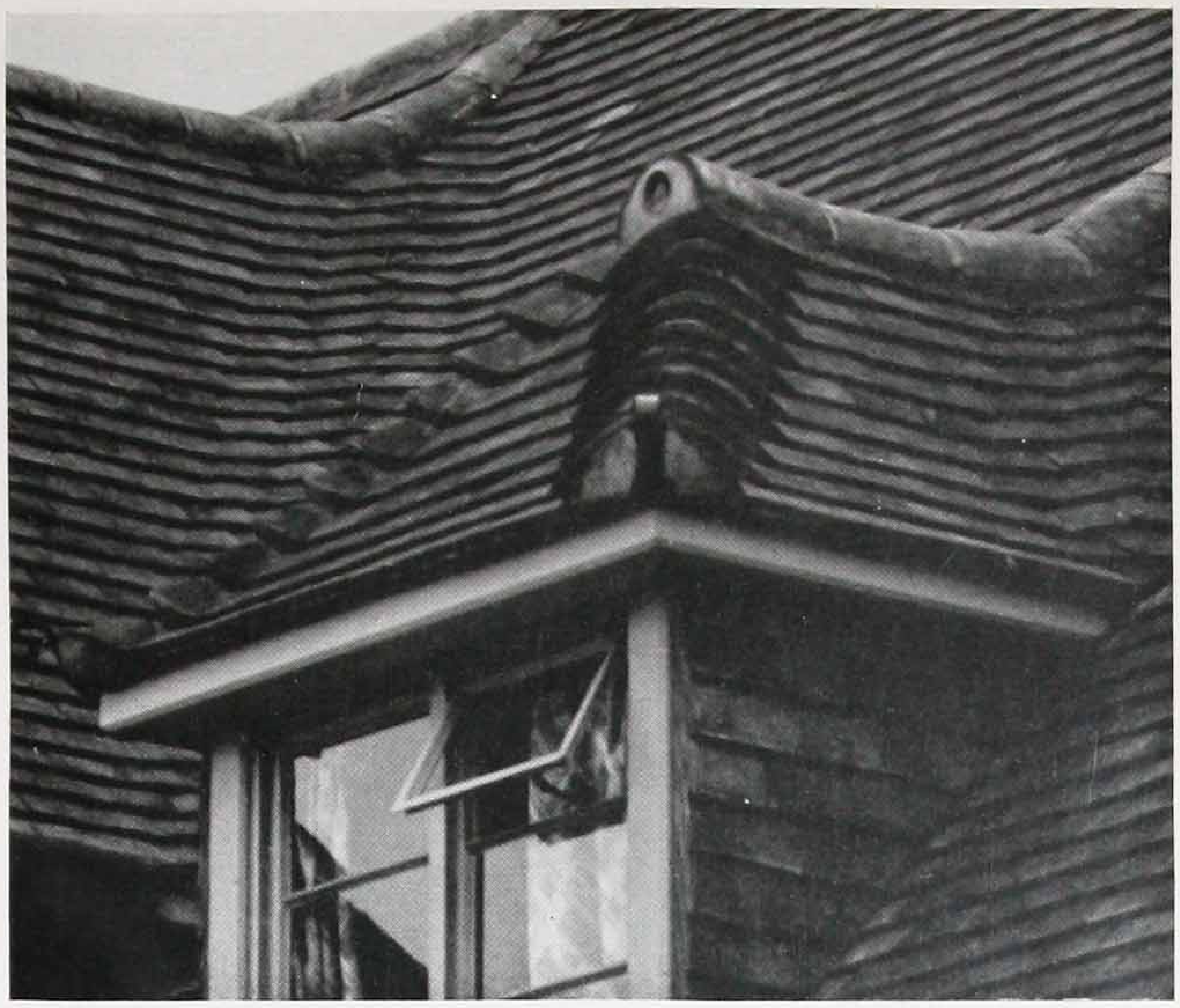
DETAIL OF ·CORBELLED· EAVES SHOWN BELOW.

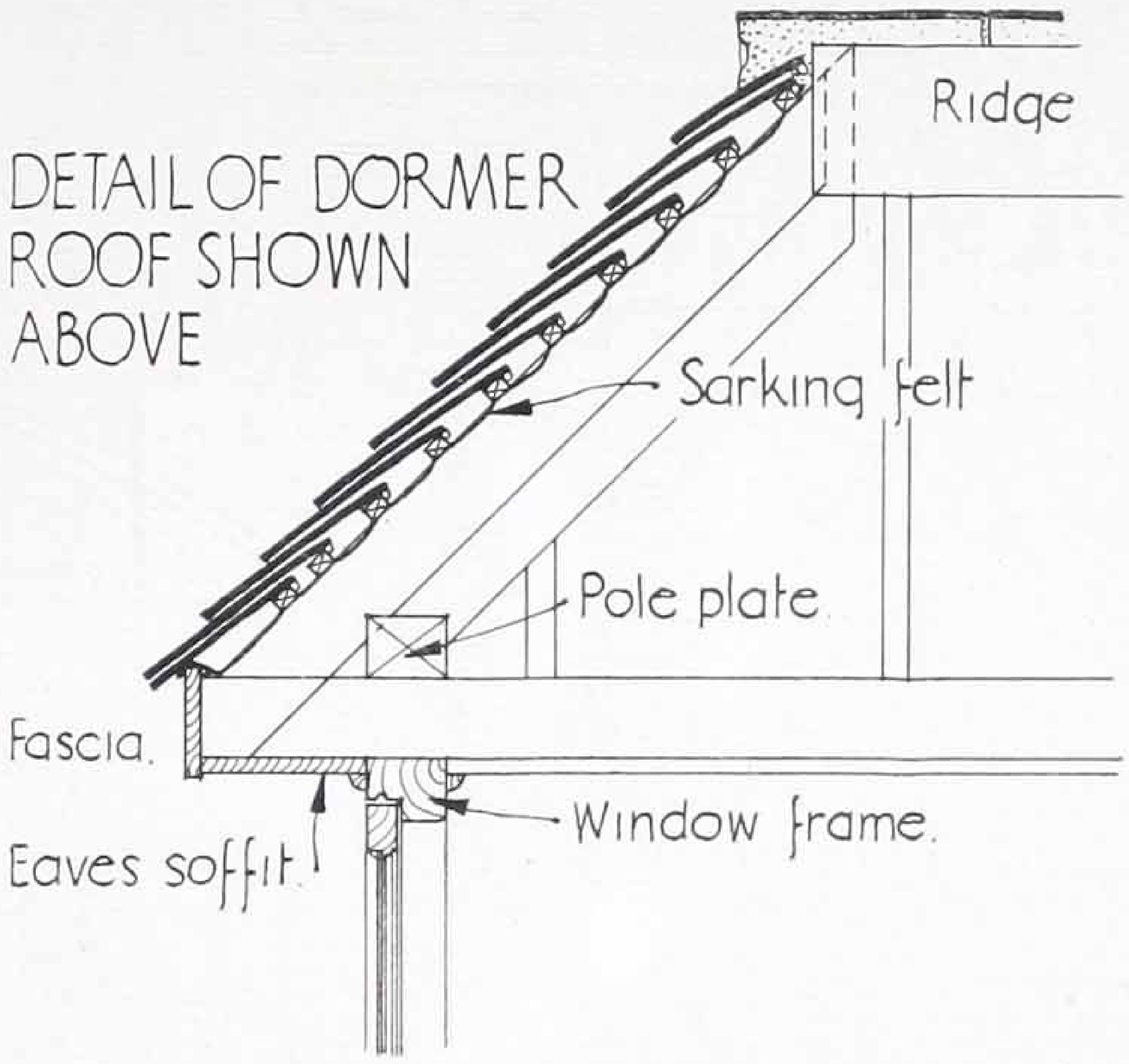
Dormers

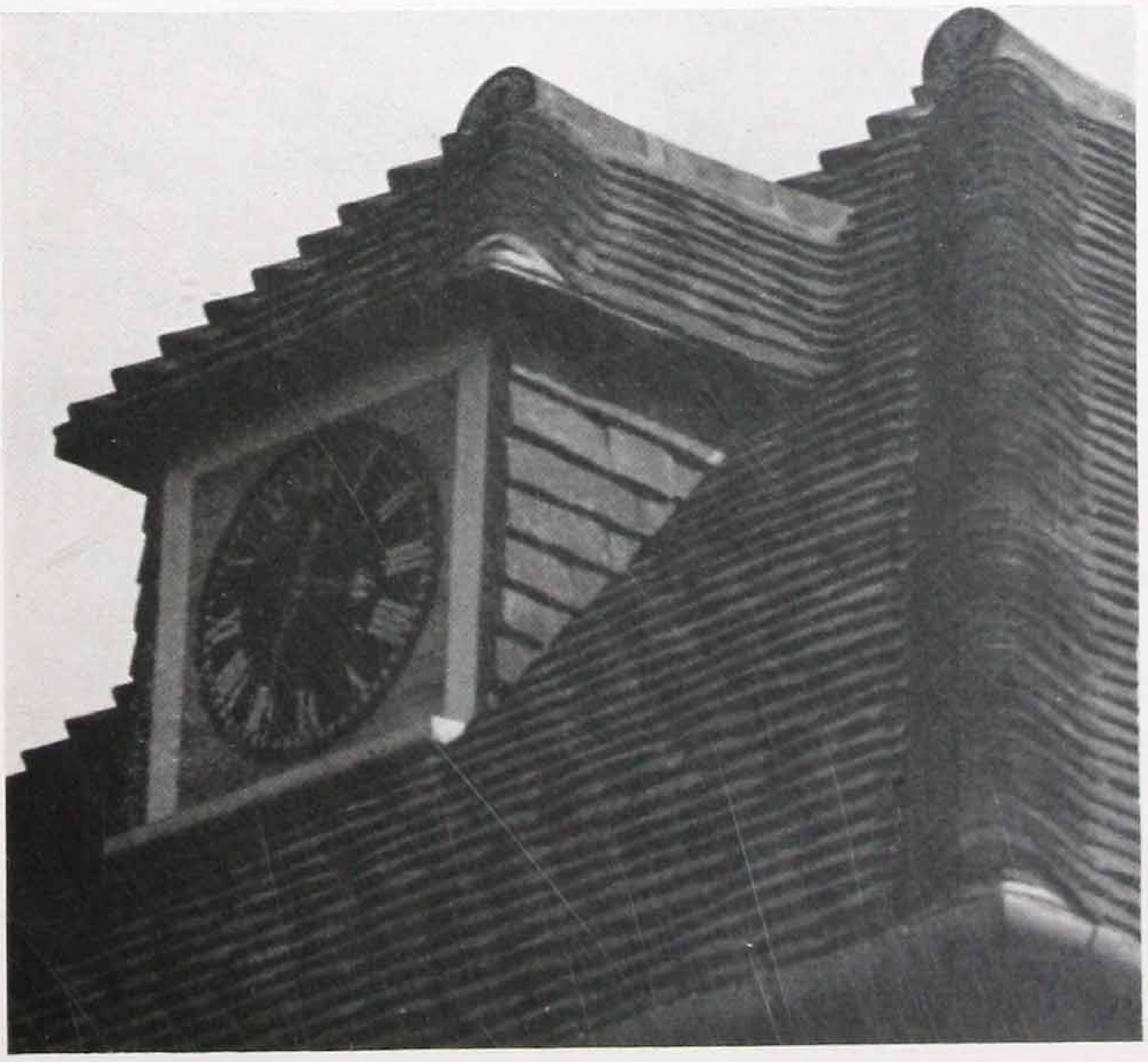
The tiling of dormers combines almost every form of tiling—ridge and hip tiling, tile hanging, valley tiling and abutments. Where the dormer projects only a little above the eaves the tiling may be swept over it, but where it occurs completely above the eaves or is set back from the wall face the treatment is more complicated and, indeed, combines in miniature the tiling of a complete roof.

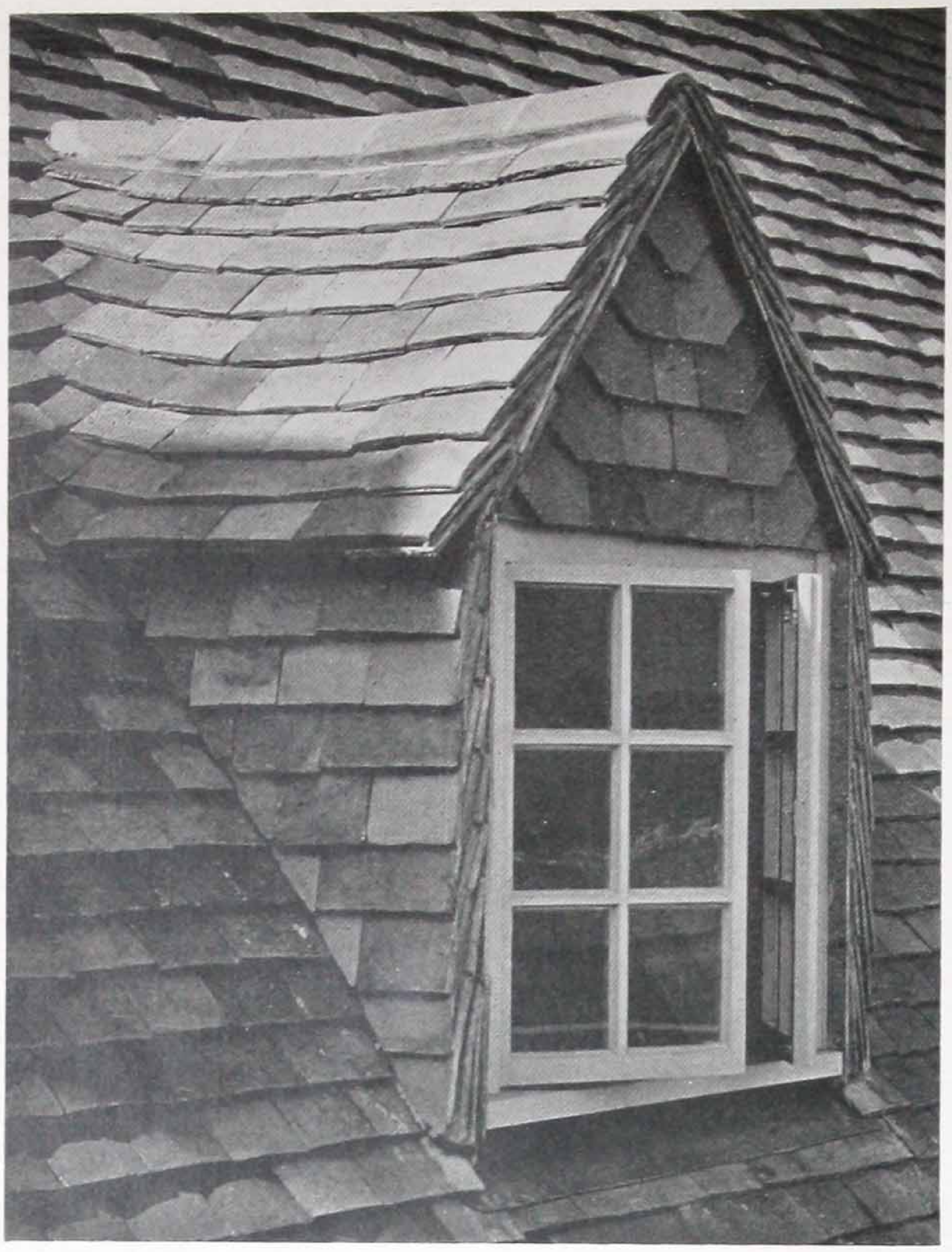
As with most tiling details there are numerous variations of design and construction of dormers depending upon the conditions imposed by each individual case, the effect, in appearance, which is required and the tiling technique used. The dormers shown in the photographs on this page are substantially of the same kind, although each varies in minor details ; for instance, these have laced valleys and on page 58 the valley is formed with a valley tile. The valleys, the hips and the ridges of dormers present the same problems as they do in main roofwork, and are dealt with in the same way. The tile-hung cheeks of the dormer are hung in the usual way, but the finish in the front against the window frame and the junction between the cheeks and the main roof present minor problems which should always be carefully detailed. All the examples illustrated here show close-cut tiling at the junction between the dormer cheek and the main roof, and are made weatherproof by the lead soakers concealed under each course of tiles. Another method is to provide a small gutter, stopping the main tiling 2 to 2½-in. back from the dormer cheek. The appearance of this method is, however, not as good, and the gutter is also liable to become choked if leaves or other debris fall upon the roof.

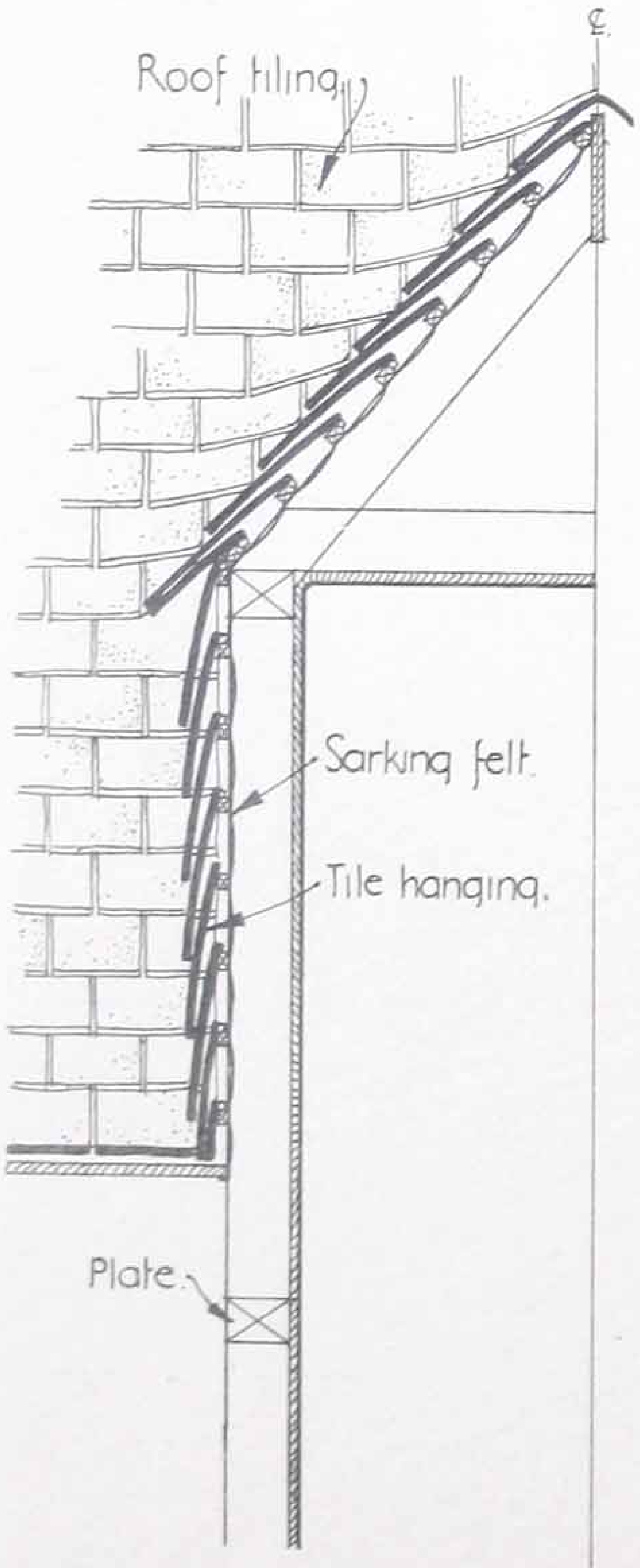
The photograph overleaf shows a well-detailed dormer with a tile-hung gable.



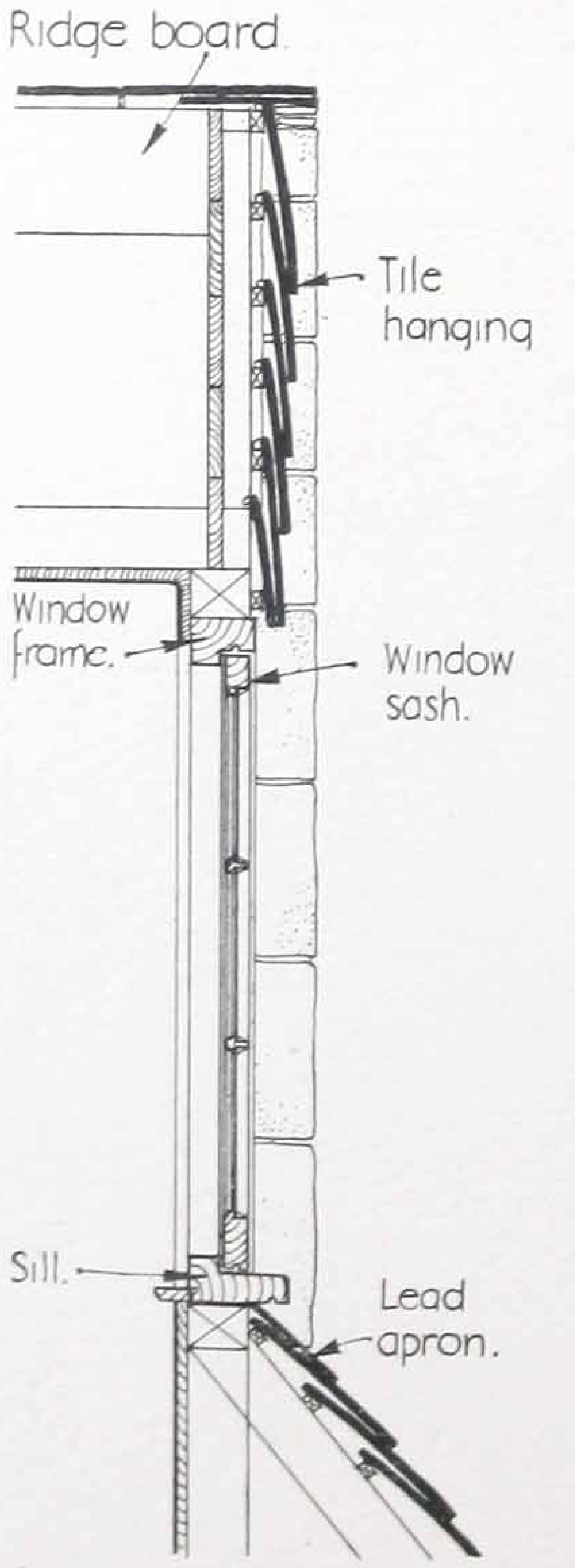








HALF CROSS SECTION THRO' PITCHED ROOF & GABLE CHEEK.



SECTION THRO' GABLE END OF DORMER.

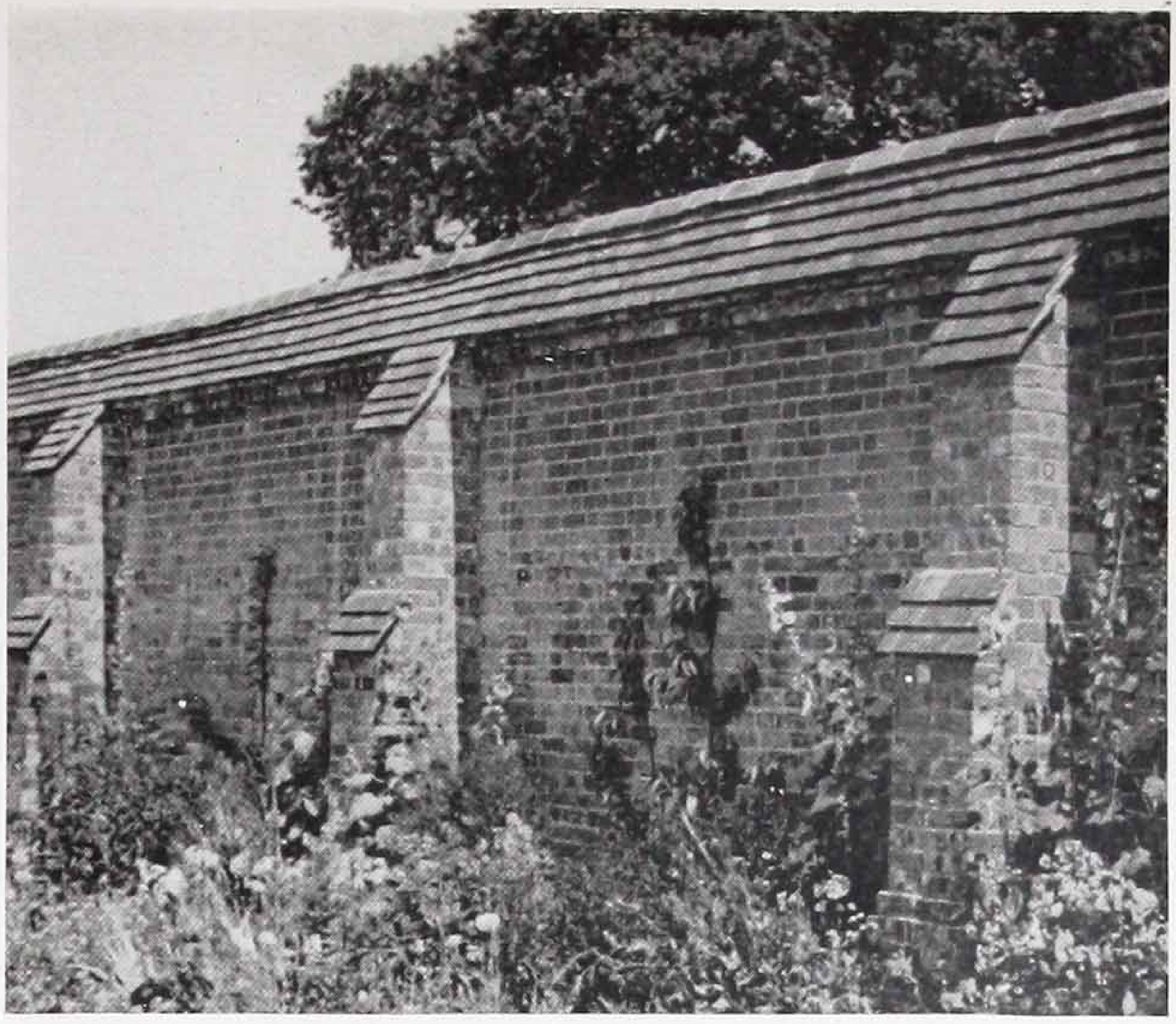
Verges

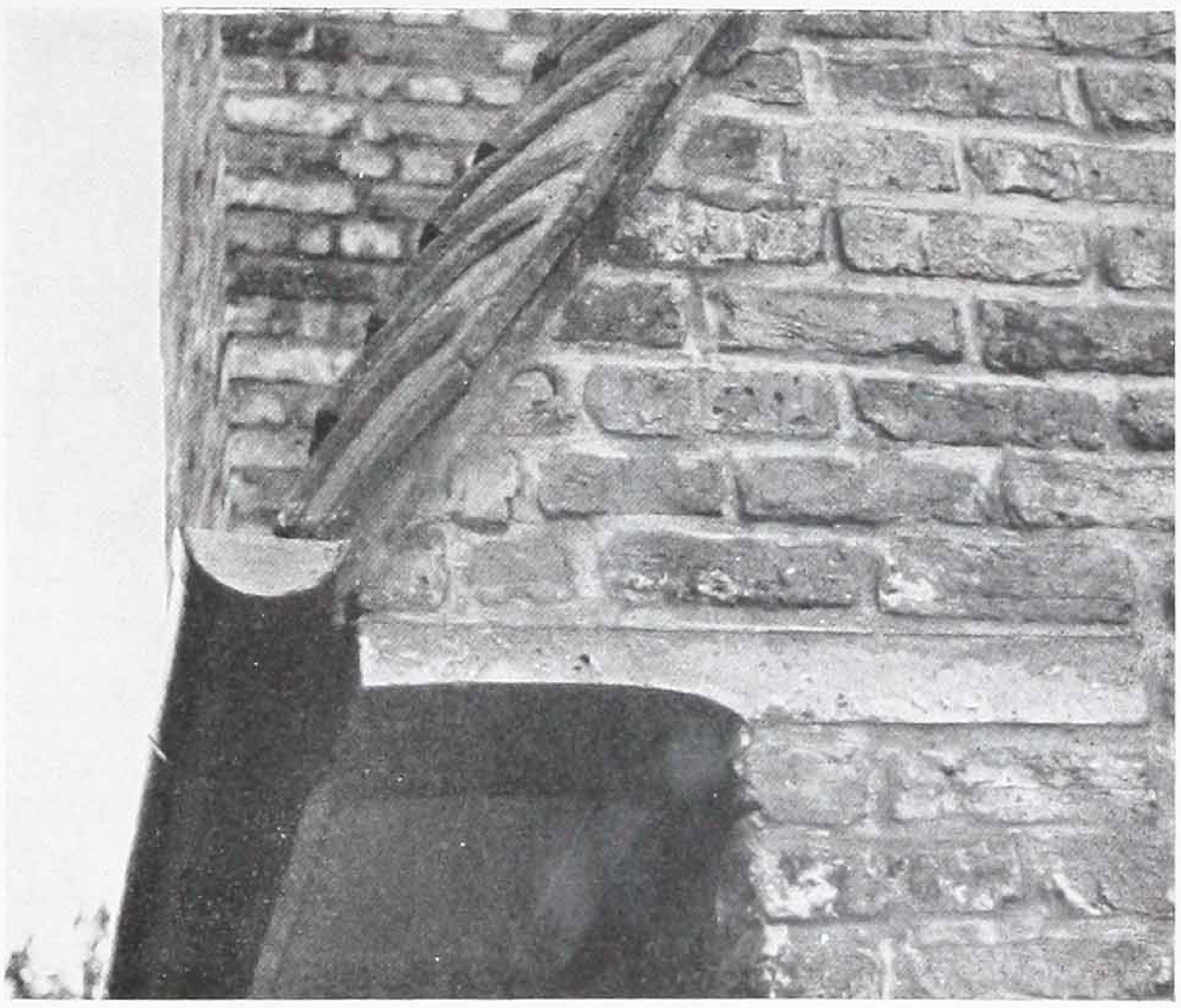
Tile-and-a-half tiles are normally used in alternate courses at all verges and abutments to start the bond. Verges are edge-bedded and pointed, and plain tiles used sideways may be fixed as an undercloak, as in the centre photograph on opposite page the undercloak being preferable as it improves the appearance of the roof and slightly tilting the verge tiles, tends to throw the water back on to the main roof. An undercloak also provides a good straight line against which to cut hanging tiles where vertical tiling is to be fixed under the gable as illustrated here. The tilt can be increased by fixing a double undercloak. With single-lap tiling the undercloak of plain tiles is essential to a good finish and reduces considerably the risk of water entering under the verge. With pantiles a good finish at left-hand verges is obtained by the use of double-roll tiles which avoid the dissimilarity between right and left-handed verges.

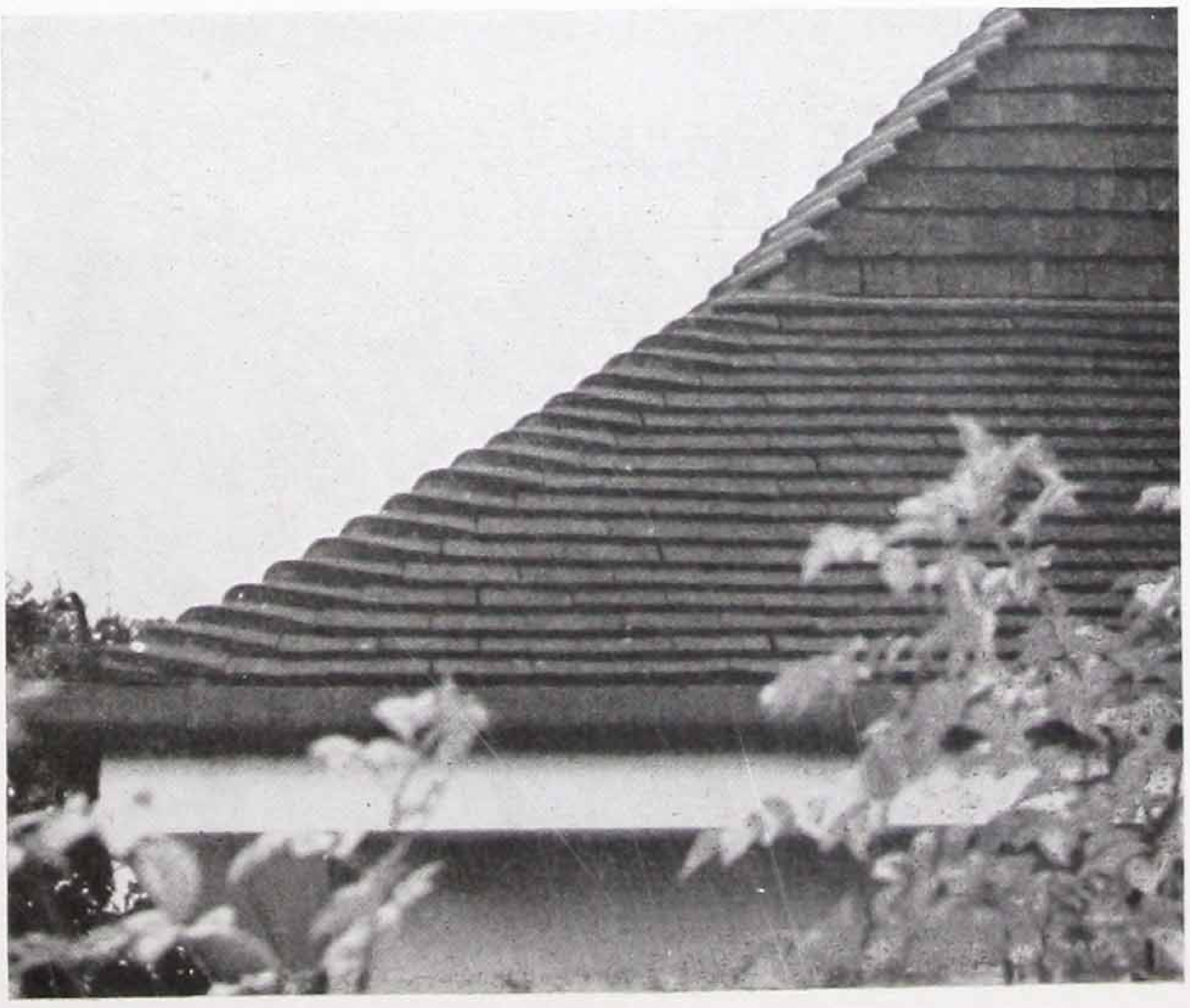
Nails and Nailing

Originally all plain tiles were made without nibs and each tile had to be fixed with two nails. The introduction of the nibbed tile permitted a reduction in the amount of nailing. It is now considered normal good practice on roofs of all normal pitches to nail every tile in every fifth course, each tile being fixed with two nails.

Every third course of tiles should be nailed on ordinary or mansard roofs at pitches of 50 to 55 degrees, every tile with one nail on pitches of 57½ to 60 degrees, and every tile with two nails on pitches steeper than 60 degrees and on vertical surfaces. At eaves, top courses, and where a roof meets an abutment horizontally two courses of tiles should be nailed, and two tiles in each course at verges, on either side of valleys and hips and where a roof meets an abutment at an angle. Since clay tiles, in themselves, are practically everlasting, it is as well that their accessories should be as durable as possible, and therefore the material of the nails needs consideration. Unprotected iron nails must not on any account be used ; they quickly corrode and the swelling accompanying corrosion will fracture the tile through the nail hole. Galvanised iron or steel nails, zinc-coated by dipping in spelter (molten zinc) are suitable for inland rural districts and non-industrial towns. Elsewhere, either zinc, copper or cast yellow metal (63 per cent. copper, 36 per cent. zinc, 1 per cent. tin) should be used, except that, near the sea coast and certain chemical factories, zinc is unsuitable. Yellow metal nails being harder, and hence more easily driven, are preferable to copper. Nails should not be less than 1½-in. long and should have good substantial heads.







The foregoing has been prepared for the information and improved knowledge of the tile and building trades. That it will prove of service is the earnest wish of . . .

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